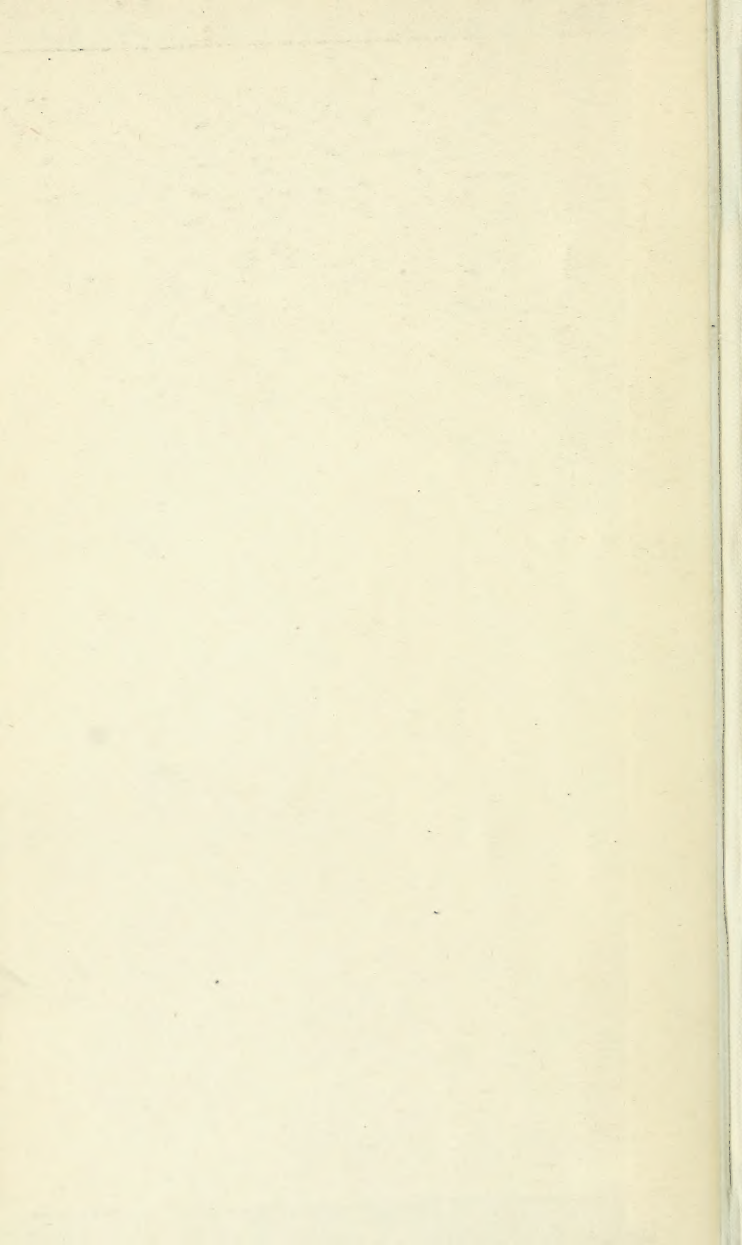
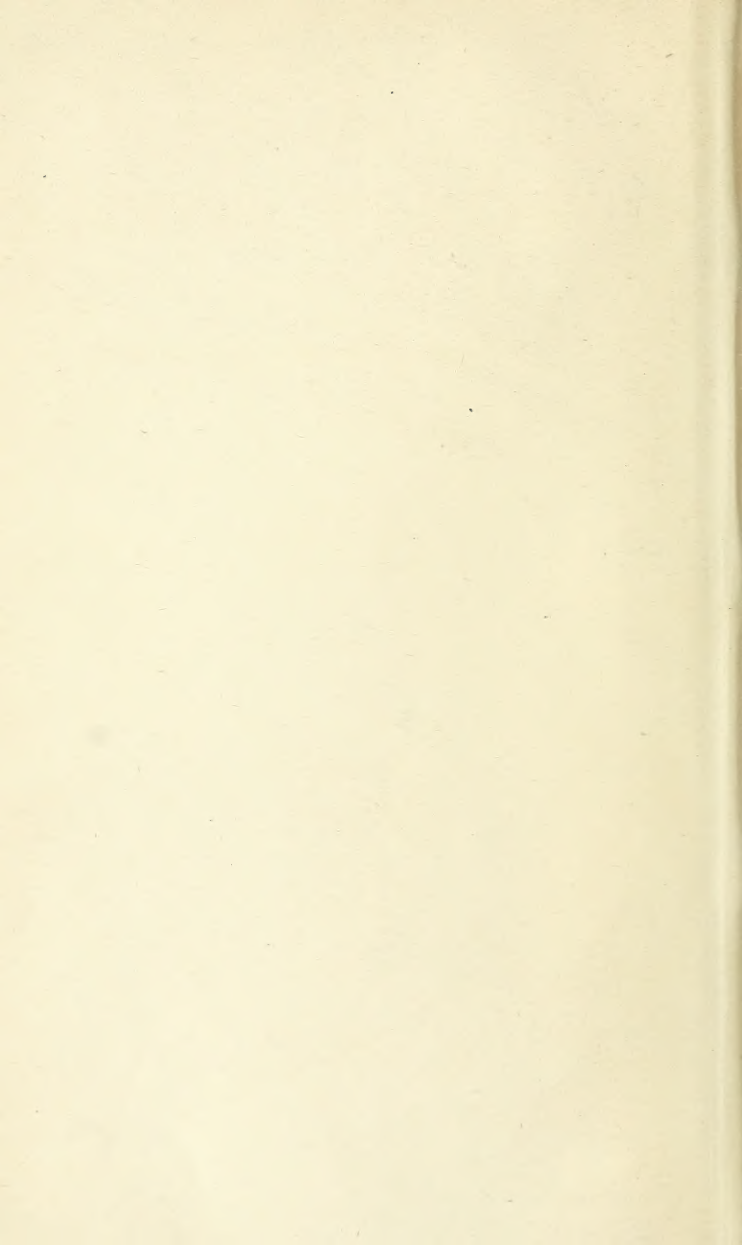


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AMERICAN
JOURNAL OF OBSTETRICS

AND

Diseases of Women and Children

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NO 1.

ORIGINAL COMMUNICATIONS.

SURGICAL REPLACEMENT OF THE RETROPOSED UTERUS.

BY

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New York.

(With four illustrations.)

THERE can be little difference of opinion regarding the treatment of the acute form of retrodisplacement of the uterus. This condition occurs more often than is supposed, but is mistaken for some other acute pelvic or abdominal lesion. The resulting pain is usually severe at first, gradually lessening by rest and position until the condition, unrecognized, passes into the chronic form.

The chronic form of retrodisplacement seems an ever-present pathologic problem and as long as there exists a diversity of opinion among students of gynecology regarding its surgical treatment, further study is demanded.

Until September 3, 1901, my experience in the surgical correction of retrodisplacements was confined to the operations then in vogue, namely, shortening of the round ligaments through the inguinal canal, ventral suspension and ventral fixation. My results in the majority of cases were not satisfactory either in respect to position or relief of symptoms. External shortening of the round ligaments was more or less successful but offered the objection that it did not permit of the correction of obscure pelvic complications. When it was accomplished with the addition of an abdominal section and exploration of the pelvis, symptomatic results were markedly improved. Ventral suspension frequently failed to permanently

correct the position and ventral fixation so limited the motion of the fundus that the pregnant uterus at times did not develop normally. My observations of the results of the work of other operators convinced me that they were much the same as mine. Such unhappy experiences stimulated me in the effort to devise some method which would ensure both permanent replacement and

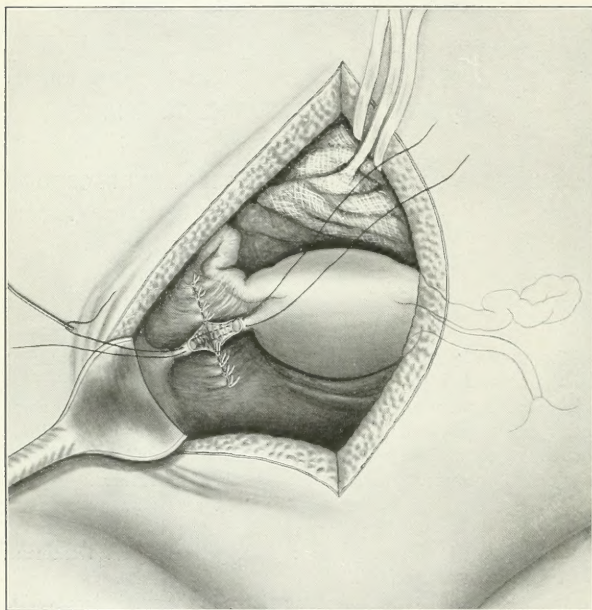


FIG. 1.—The plan first adopted but abandoned because of the difficulty of adjusting with exactness the ends of the round ligament, especially when small.

normal mobility of the uterus and its adnexæ, and afford at the same time opportunity to correct associated abnormalities.

As far as I have been able to ascertain, shortening of the round ligaments by excision of part of them and reuniting of their cut ends and shortening of the broad ligaments by splitting their surfaces and suturing each separate surface on itself had not been done prior to 1901.

The plan first adopted (see Fig. 1.) consisted in the removal of the greater portion of the round ligament, leaving about 1.5 cm. of the proximal portion and 1.5 cm. of the distal portion. This excision of a

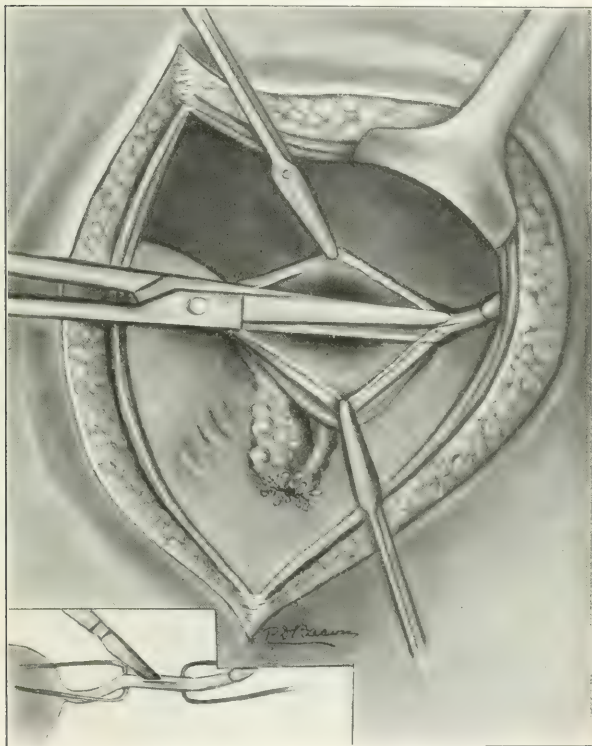


FIG. 2.—The small cut shows the first step in the operation. Here the middle portion of the ligament is drawn taut and split longitudinally. The larger cut shows the second step or the complete splitting of the round ligament and separation of the surfaces of the broad ligament.

portion of the round ligament exposed the upper margin of the broad ligament where the line of cleavage could easily be found and the two surfaces of the broad ligament were forced apart by blunt dis-

section. The ends of the round ligament were then united and the surfaces of the broad ligament were folded upon themselves at

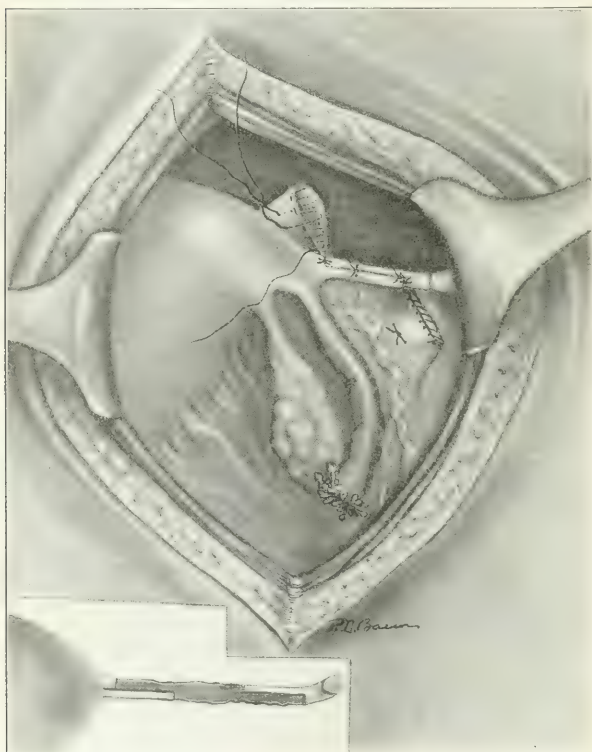


FIG. 3.—The small cut shows the third stage where a section of the anterior and a section of the posterior split portions of the round ligament is cut away from its broad ligament attachment and the remaining portions ready for adjustment. The large cut shows the remaining split portions of the round ligament adjusted, and the separated anterior and posterior surfaces of the broad ligament folded upon themselves.

right angles to the direction of the round ligament and so sutured. The amount of round ligament removed varied, but the newly constructed ligament was approximately 2.5 cm.

This plan was followed for three years, then because of certain recognized defects in the technic, resulting in six known failures out of forty-three cases, it was abandoned. The chief difficulty was that the exact apposition of the ends of the round ligament was often most difficult, especially when the ligament was small. Out of the foregoing plan the method I now employ was evolved.

With the present technic (See Figs. 2 and 3) the round ligament is grasped near its center with two sponge forceps or bullet hooks. These forceps are 2 cm. or more apart. Gentle traction is made and the tense portion of the ligament between the forceps is split through its middle longitudinally, the point of the knife passing down between the surfaces of the broad ligament. Each split portion of the round ligament is now grasped with a Sims-Tait forceps and the sponge forceps or hooks released. The straight Mayo scissors is next passed through the split in the round ligament and forced down between the layers of the broad ligament and opened several times so as to separate the surfaces. With the same scissors the longitudinal division of the round ligament is continued on the distal side to within close proximity of the infundibuliform process of the ligament and on the proximal side to its uterine insertion. The anterior split portion of the round ligament is now severed about 1.5 cm. from the infundibuliform process and cut away from its broad ligament attachment. The posterior split portion is severed about 1.5 cm. from its uterine insertion and cut away from its broad ligament attachment. The cut end of each remaining split portion of the round ligament is sutured to its corresponding cut end with silk or linen and the apposing lateral surfaces of the split portions are held together by plain catgut No. 0 penetrating them at their middle.

Thus reconstructed, the round ligament is about 2.5 cm. or less in length and larger in diameter than it was previously. The posterior surface of the broad ligament is now grasped at its middle, folded upon itself, and penetrated at its base with a mattress suture of No. 1 chromic gut, care being taken not to encroach upon the Fallopian tube in passing the suture. When the mattress suture is tied the posterior surface of the broad ligament is narrowed, the cut edge of the fold is united with a continuous catgut suture. The anterior surface is treated in the same way, care being taken not to injure the uterine artery. By this technic the broad ligament surfaces are shifted so as to make the outer or distal portion of the anterior surface appose the inner or proximal portion of the posterior surface, with the resulting narrowing of the entire ligament.

As the mechanical and surgical principles of this procedure are correct theoretically and practically, there is resulting no disturbance of the anatomical relationship of the uterine adnexæ. The round ligament by this technic is shortened and the broad ligament narrowed, not by union of their peritoneal surfaces, but by direct union of their muscular and cellular tissues, and being thus reconstructed are essentially the same as when originally created. The maintenance of the uterus anteriorly is by this technic not dependent upon the round ligaments alone, as is the case in many procedures now in vogue, but upon both the round and broad ligaments.

A temporary suspension of the uterus is done when the uterus is found to be large and heavy. The technic employed is as follows: a No. 2 chromic gut suture is passed through the right rectus muscle and peritoneum near the lower angle of the abdominal wound. It then penetrates the anterior surface of the uterus near the fundus, emerging on the posterior surface at an opposite point. It then penetrates the posterior surface at a point 1 cm. from where it emerged and is passed through to the anterior surface, emerging about 1 cm. from where it originally entered. The suture is then passed through the peritoneum and the left rectus muscle near the lower angle of the wound and tied, when the peritoneal opening is closed. When the sustaining suture is tied, the unscarified peritoneum of the anterior fundal area is apposed to the unscarified abdominal peritoneum. These apposed surfaces are, as a rule, held together only so long as the resisting force of the suture lasts, and does not result in a firm union. When the sustaining suture begins to weaken, the partial filling of the bladder becomes an important factor in forcing apart the surfaces. Should, however, the union be firmer than desired, the development of the uterus in pregnancy is not interfered with to the extent it would be if union took place at the fundus or on the posterior instead of the anterior fundal area (see Fig. 4).

I have had the opportunity to reënter the abdomen on two occasions when this form of temporary suspension was made, and in neither instance was there evidence of a suspension having been done. Nor have any of the cases which became pregnant developed serious complications during their labor.

The great advantage of this procedure when used in connection with the shortening of the ligaments is that under all circumstances it relieves strain upon the reconstructed ligaments until they are firmly united.

The main features for consideration when studying the results of operative work for the correction of retrodisplacements of the uterus are the position, mobility of the organ, and the relief or nonrelief of symptoms. In determining the position of the uterus an empty bladder at the time of examination is essential. Permit me to briefly relate a personal experience illustrative of this point. An examination of one of my early cases was made by me when the bladder was empty and the position of the uterus found normal. I was so gratified with the result that I sent the patient to a gynecologist of high repute interested in my work. The patient was examined by him about two hours or more after I saw her. He reported to me his disappointment in finding the uterus out of position. The patient had had no opportunity between visits to

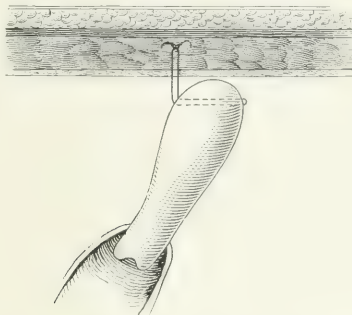


FIG. 4.—A suspension of the uterus which is the least liable to remain permanent. Care is taken not to injure the peritoneum of the fundus.

relieve herself and consequently there existed at the time the examination was made by my friend a full bladder and a receded uterus. The anterior position of the uterus was verified by me at a subsequent examination when the bladder was empty.

I have had the opportunity to study the results of 185 cases during the past thirteen years. They are sufficient to enable me to form a definite opinion regarding the permanency of position, the degree of mobility and functioning of the uterus. These cases have been subjected to the usual tests during a period of from one to eleven years. Eight of these were failures with respect to position. In six of the eight, the first technic described was followed. In

one the fundus was suspended with chromic gut sutures in addition to the shortening of the ligaments, and in one the present technic alone was employed. Two of the six were cases complicated by adnexal disease and pelvic adhesions. In three of the six recurrence took place within two weeks after the operation, one recurred after three months, in the other two the time of recurrence was uncertain. As to exciting causes, two followed distention of the bladder, one straining at stool and one the lifting of a heavy weight. But improper execution of technic was doubtless the important factor in these disastrous results.

I have had the opportunity to reopen the abdomen in seven cases; four of these were for lesions which were not in any way associated with the original condition. In one case the position of the uterus was good, but dense adhesions existed between the bladder and the anterior surface of the uterus. In two cases the position of the uterus had recurred and in addition there were adhesions posteriorly. In the four cases operated on for the correction of independent lesions such as ovarian and fibroid tumors, or for intraabdominal exploration, it was impossible to tell that an operation had been done upon the ligaments, the only difference between these and the normal was that the ligaments were shorter and less relaxed. One of these cases was opened seven or more years after the original operation, during which time the patient had borne three children, and she was presented for examination at a meeting of the New York Obstetrical Society held at the Woman's Hospital in 1909. In the case in which the adhesions were found between the uterus, bladder and anterior surface of the broad ligament, a modification of the technic had been done, namely, suturing the folded anterior surface of the broad ligament to the anterior surface of the uterus in addition to splitting and splicing the ligaments. This case was relieved of convulsions for one year. On the return of the convulsions a year after the first operation, I opened the abdomen again and removed the uterus and adnexæ. In the second case, with recurring pelvic adhesions, fixation of the uterus to the abdominal wall was done at the second operation, but in neither case were symptoms relieved.

The one case of failure operated on by combining the technic of temporary suspension of the fundus and shortening the ligaments will be considered later with the cases of pregnancy and labor. The case which failed where the present technic alone was employed should be related somewhat in detail. The patient left the hospital earlier than I usually allow such patients to leave, and as a precautionary measure, she living in the country away from my im-

mediate supervision, I introduced a pessary, a procedure not my custom, with the instructions that she return at a stated time to have it removed. Three months after operation she presented herself for examination with the same group of symptoms prior to the operation and the uterus was found completely retrodisplaced. She related the following history. Shortly after her return home, feeling in the best of health, she removed the pessary, and when menstruation began, apprehending a profuse flow as previously existed, she packed the vagina with cotton, which had for many years been her custom, and it may be incidentally stated that the amount of cotton she was able to insert and retain would have done credit to an expert packer. Eight weeks after operation she spent a day in the city shopping and was careless regarding the evacuation of her bladder. She became extremely tired on her return home and from then on the old symptoms reappeared. She was a woman of good mentality but opinionated and indifferent to advice. Though improper care of herself may in great part have been responsible for disastrous results, the failure must be credited to the operation or operator.*

In cases where the uterus remained permanently replaced the results with few exceptions were absolute relief of symptoms. Three exceptions are worth noting; one of these was a case related above, the convulsions returning within a year after operation. The other two were not relieved until in each case the right kidney was fixed. In one of the latter cases I opened the abdomen to determine if there existed any obscure pelvic lesions. I found the uterus in perfect position and demonstrated through the incision the low position of the kidney.

The initial case of my study, operated on September 3, 1901, stood the test of two labors successively and was reported on by a committee of the New York Obstetrical Society both in 1901 immediately after the operation, and in 1909, about two years after her last labor. Another case stood the test of three labors and was reported on by the same committee in 1909. I had the opportunity immediately after presenting the latter patient for examination to open her abdomen that I might determine the origin of certain distressing symptoms which had recently arisen. Two very small fibroids on the fundus and engorged veins in the infundibular pelvic portion of the broad ligament were the only abnormalities in the pelvis. The uterus was in normal position and the ligaments normal.

* This case became pregnant one year later and was delivered at full term, since which time I have not seen her for examination.

A right prolapsed kidney, which was noticed previous to exploration was determined intraabdominally to be the only pathologic lesion of sufficient importance to produce the existing symptoms. The kidney was then fixed with permanent relief.

Nineteen labors were successfully terminated in fourteen women and without recurrence of retroposition of the uterus save in one instance. Forceps were used in three of the seventeen deliveries, vaginal Cesarean section in one; the reason given by the attending physician in each instance was uterine inertia. One of the cases in which forceps was used was subsequently delivered by me without the use of forceps. The single case in which retrodisplacement of the uterus occurred was that of a woman who had been severely injured by forceps in her first labor, previous to my operation for retroversion. Injuries inflicted on the pelvic fascia at the time of this labor were excessive, resulting in partial prolapsus of the uterus and permanent and wide separation of the pubic bones. The cervix and perineum were also badly injured. The result following her labor after operation for correction of displacement was a complete prolapsus of the uterus, and hysterectomy with pelvic fascial repair was eventually necessitated. In one case miscarriage occurred at the end of the third month, cause unknown, but the position of the uterus was not affected.

In securing the histories of cases of movable retroposed uteri it is not uncommon to find that eight or ten hours may elapse without the patient evacuating the bladder and often without any distress or desire to micturate. This fact is evidence in support of the theory that when the pelvic organs are in normal relationship and the normal capacity of the bladder is reached, the resistance offered by the lateral ligaments and consequent tension upon them is an important factor in arousing the consciousness of the existing condition and a desire to micturate. To combat the ill effects of postoperative distention of the bladder, I have resorted for several years to frequent postoperative catheterization. The rule which I usually establish is: catheterization every six hours and before if the patient expresses distress in the vesical region. If frequent passing of small quantities of urine occurs, which is always suggestive of overdistention, catheterization is immediately done to determine the true condition of the bladder. Before catheterization, the tip of the catheter is inserted in 15 per cent. solution of argyrol, which prevents cystitis.

The correction of retrodisplacements through the intraabdominal route affords opportunity to investigate and remove associated

intraabdominal lesions and constitutes a decided advantage. But intraabdominal methods which create false ligaments or utilize the normal ligaments with resulting abnormal relationships of the pelvic organs, while they may correct permanently the position of the uterus and at times afford relief of symptoms, establish by the very means of correction an ever-present possible source of serious disturbance.

The criticism that might with justice be made of the technic here advocated is that the preparation and adjustment of the ligaments necessitate such exactness of work as to constitute an objection.

219 WEST SEVENTY-NINTH STREET.

REPORT ON A CASE OF CARCINOMA UTERI TREATED ACCORDING TO THE PERCY METHOD, WITH AUTOPSY FINDINGS.*

BY

FREDERICK W. BANCROFT, M. D.,

New York City.

(With nine illustrations.)

History.—Much has been written during the last decade upon the susceptibility of carcinoma and sarcoma cells to low degrees of heat. Clowes, in 1906, stated that tumor cells *in vitro* die when exposed to a temperature of 45° C., while connective-tissue cells will survive, although their growth is inhibited. Haaland has shown that carcinoma cells are more susceptible to heat than sarcoma cells, they die after an exposure of one-half hour, to a temperature of 45° C. Loeb has confirmed this. E. Vidal noted the arrested development of tumors in four patients suffering from infection with a rise in temperature above 40° C. He repeated these results in experiments on animals. He suggested that the occasional benefits derived from vaccines, etc., is due to the high temperature produced by the body reaction. During and Grau believe the efficiency of the high-frequency currents is due to heat alone.

On the other hand, M. Doyen has shown the death point of carcinoma cells is 55° C. Living connective-tissue cells are killed at a temperature varying from 55° to 65° C. In 1912 Percy published his report in regard to the treatment of carcinoma of the cervix and uterus by low-temperature cauterization. He bases his operation

* Read at a meeting of the Section on Gynecology and Obstetrics of the Academy of Medicine, January 25, 1916.

upon the premises: First, that a low grade of heat, about $45-50^{\circ}\text{C.}$, will kill carcinoma tissue, while living connective tissue and muscular tissue will survive. Second, that low degree of heat will penetrate much farther than high.

His first premise, he assumes from a study of above-mentioned experimental work of Haaland, Clowes, and Loeb. His second premise is deduced from experimental results obtained on pieces of dead beef.



FIG. 1.—Photograph of gross specimen.

Percy found that with a very hot iron carbonization of the surrounding tissues occurs, preventing heat conduction, and that coagulation occurs only for a distance of $\frac{1}{2}$ inch from the iron. On the other hand, with a low grade of heat, coagulation occurs for a distance of $2\frac{1}{2}$ inches in all directions from the cautery iron. He has devised a cautery which is attached to a rheostat so that he is able to control the heat in the iron. He performs a laparotomy, ligates on both sides the ovarian, and either the uterine, or internal iliac

arteries. The assistant then grasps the uterus in his hand and through a water-cooled vaginal speculum the cautery is applied to the neoplasm. The temperature of the iron should be so low, that no smoke is produced, and that a gentle simmering of the tissue occurs. It should take about one-half hour for the heat to penetrate to the periphery of the uterus. If the heat transmitted through the uterus, causes discomfort, it is a sign that there is too high a temperature. The assistant's hand also, acts as a gentle guide

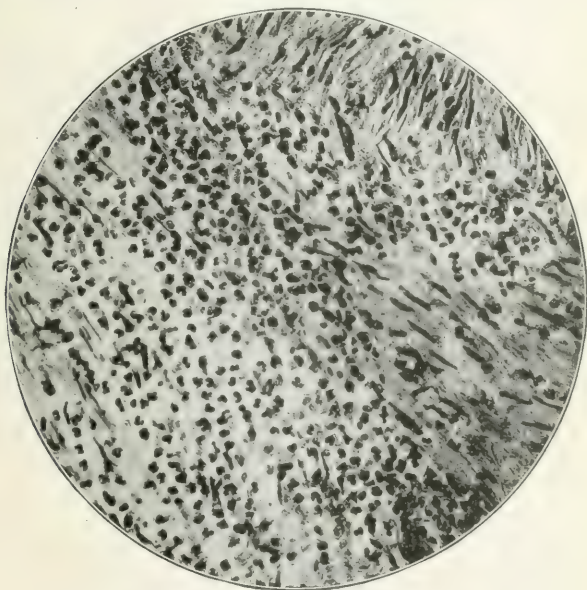


FIG. 2.—Area of inflammatory reaction.

to the iron. The cauterization is continued until the uterus is movable, and all parts have been well exposed to the heating-iron.

Boldt, in a recent number of the *AMERICAN JOURNAL OF OBSTETRICS* (Jan., 1916), has published a report of an autopsy of a case that died eight days after the Percy operation. The cause of death was general peritonitis. He stated that there were numerous viable cancerous cells present in the uterine wall. In the uterine cavity an eschar had been formed, a definite line of demarcation separated it

from the remainder of the uterus. Passing from the eschar toward the periphery of the uterus, several zones were noted: 1. A narrow hemorrhage zone, with numerous inflammatory, fragmenting, and seminecrotic cells scattered through it. 2. This zone gradually passed into an inflammatory area where there were numerous poly- and mononuclear leukocytes. 3. Beyond this, an area where the cells of the myometrium were viable but no living carcinoma cells.

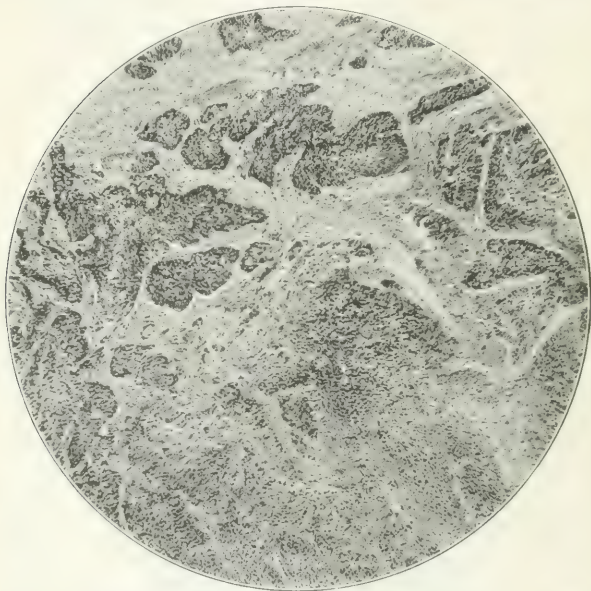


FIG. 3.—Low-power view. Complete necrosis at lower right corner. At upper portion of field are numerous nests of cancer cells.

4. A zone containing nests of cancer cells with nuclei and protoplasm well stained are observed in the myometrium, they show no evidence of injury.

He concludes that there is no evidence that low grades of heat are more efficacious than high-temperature cauterization.

REPORT OF AUTHOR'S CASE.

Woman, aged forty-three, admitted to Dr. Pool's service at the New York Hospital on November 6, 1915.

Present Illness.—About July 26, 1915, patient was taken with a profuse flowing of blood from the vagina. It persisted for four weeks. There were large clots of blood passed. After the cessation of the hemorrhage there has been an intermittent bloody discharge persisting to date. On admittance, patient complained of no pain in the lower abdomen, but has pain in both "kidney regions." Had no hematuria. General health good otherwise.

Menstrual History.—Began at thirteen years. Always irregular, occurring every two to seven weeks. Never dysmenorrhea or ex-

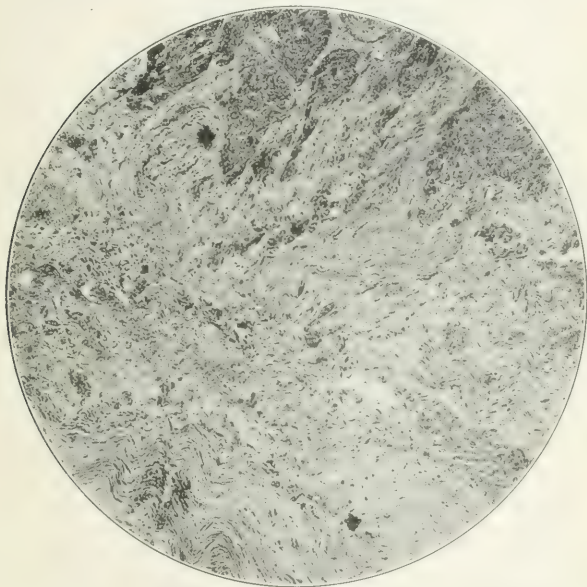


FIG. 4.—Area showing marked degeneration of muscle and carcinoma cells.

cessive bleeding. Has had one pregnancy, perineum was lacerated at that time and repaired. No miscarriages.

Past and Family Histories.—Unimportant.

Physical Examination.—Very obese woman, looks very anemic and washed out, yet does not look acutely ill. General physical examination negative except for marked pyorrhea alveolaris.

Pelvic Examination.—Cervix markedly lacerated and shows large cauliflower-like growth on both lips. The tumor is soft, friable, and bleeds easily. The fundus is fixed in the pelvis and there is marked

induration in both broad ligaments extending to the lateral pelvic walls. No glands could be palpated in the iliac region.

Operation. Incision.—Right median from umbilicus to pubis. Intestines were displaced upward by stringed pads. Through a small slit in the peritoneum, the internal iliac artery was exposed. A guy suture was placed about the ureter, for retraction and the internal iliac artery ligated immediately next to its origin from the common iliac, first on the right side, and then by a similar procedure



FIG. 5.—Low power. Carcinoma nests with nuclei and cell borders in fair state of preservation. Surrounding connective tissue edematous. Fragmentation of nuclei-cell borders indistinct.

on the left side. The infundibulopelvic ligaments were then ligated, and both tubes and ovaries were removed. The patient was then brought down to the edge of the table and placed in the lithotomy position with wet towels over the abdominal wound.

Gradual manual dilatation of the vagina was performed until it was large enough to allow the entrance of a water-cooled speculum; then with the assistant's hand on the uterus, an electric cautery of the type advised by Percy, at a low grade of heat was applied to the cervix. By this gradual cauterization, the carcinomatous tissue was

slowly destroyed so that it enabled the iron to penetrate almost to the fundus of the uterus. After cauterizing for fifty minutes and when the uterus felt to be soft, and the iron had gone up as far as seemed advisable, the cautery was removed and the abdominal wound closed in layers by the assistant.

Anesthesia.—Gas and ether. Time one hour and forty minutes.

Condition.—The patient left the operating room in a fair degree of shock. She seemed to rally toward evening, and the first morning after operation seemed in fair shape. Later in the afternoon, how-

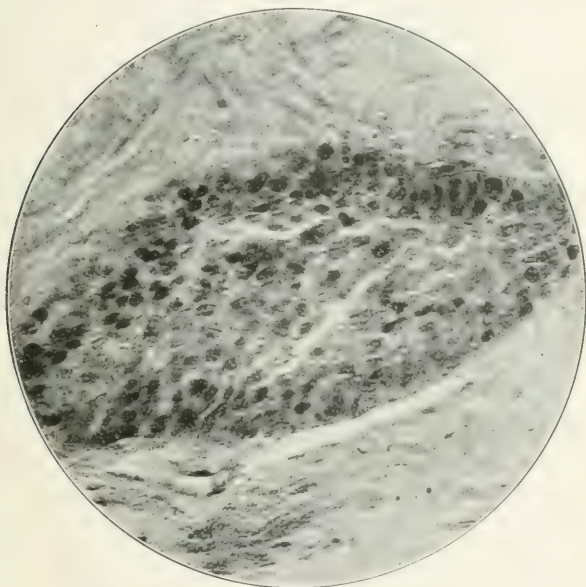


FIG. 6.—High-power view of Fig. 5.

ever, her temperature, pulse and respiration became worse and she died about noon the following day.

No physical signs of hemorrhage or peritonitis.

The following is the report of the autopsy performed by Dr. Elser of the New York Hospital.

Autopsy. Inspection.—Body of a very obese, well-developed, rather short female. Rigor mortis absent except in legs. Post-mortem lividity slight. Skin presents nothing unusual apart from

a recent sutured wound in median line of abdomen extending from umbilicus to just above symphysis. Panniculus very abundant. Musculature dark red in color, fairly well developed. Bony frame normal. Superficial lymph nodes not palpable. Eyes, pupils equal, moderately dilated, conjunctivæ normal. Nose, mouth, external ears present nothing unusual. Neck normal. Chest symmetrical and well developed. Breasts large, cut section presents nothing unusual. Abdomen moderately distended. Recent su-

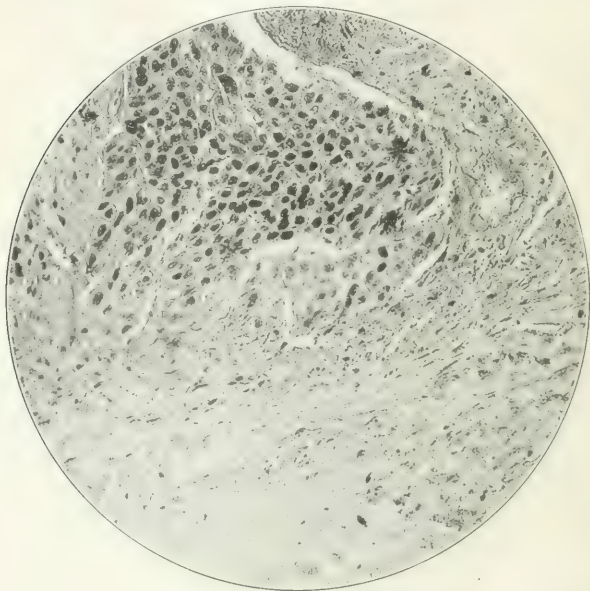


FIG. 7.—Carcinoma cells well preserved. Connective tissue edematous. Nuclei stain poorly. Cell borders indistinct.

tured wound as described above. External genitalia and extremities normal.

Peritoneum smooth and glistening throughout. No evidences of peritonitis. Adhering to some of the coils of the small intestines there are a few fragments of clotted blood and a small amount of clotted blood is found in the pelvis. Mesenteric, omental and perirenal fat is very abundant. The fat in the neighborhood of the tail of the pancreas shows a few small areas of fat necrosis.

Pleura.—Normal apart from a few firm adhesions over right lower lobe.

Thymus.—Absent.

Pericardium.—Normal.

Heart.—Heart small, weight 10 ounces. Consistence unusually soft and flabby. Right chambers are filled with clotted blood. Left chambers contain only a small amount of clotted blood. Myocardium pale red in color, very soft and friable in consistence. No focal lesions.

Valves and orifices normal throughout. Arch of the aorta and coronaries normal.

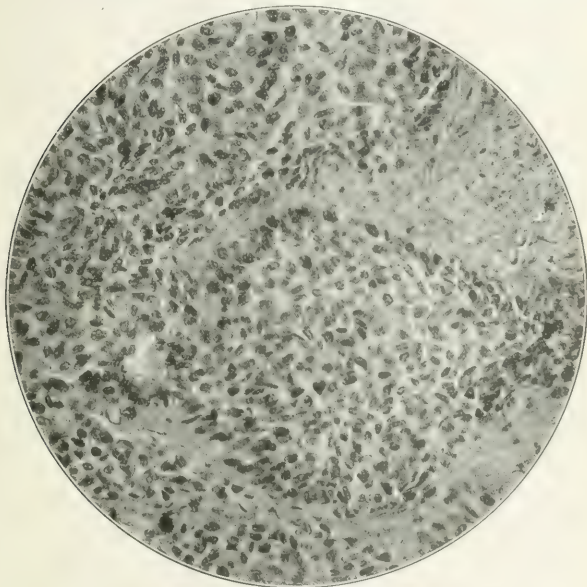


FIG. 8.—Cancer nests with cells apparently unaffected. Reticular structure damaged.

Lungs.—Both lungs are congested and edematous. No focal lesions. Bronchi filled with a frothy fluid. Mucosa congested. Bronchial nodes slightly swollen and edematous. Pulmonary vessels normal.

Spleen.—Weight $5\frac{1}{2}$ ounces. Capsule normal. Cut section pale grayish red in color. Malpighian bodies small and indistinct. Trabeculae not prominent. Pulp softer than normal.

Suprarenals.—Normal in size and appearance.

Kidneys.—Normal in size. Weight $8\frac{1}{2}$ ounces. Capsule strips

readily leaving a smooth pale red, somewhat opaque surface. Consistence normal. Cortex normal in thickness. Markings fairly distinct. Pyramids normal. Pelvis, ureters and bladder normal.

Pancreas.—Normal in size and appearance.

Liver.—Weight $2\frac{1}{2}$ pounds. Surface smooth, pale grayish red in color. Consistence normal. Cut surface smooth, pale grayish red in color. Markings are indistinct. No focal lesions.

Gall-bladder.—Gall-bladder is filled with dark green, rather thick bile. Mucosa normal. Ducts patulous.

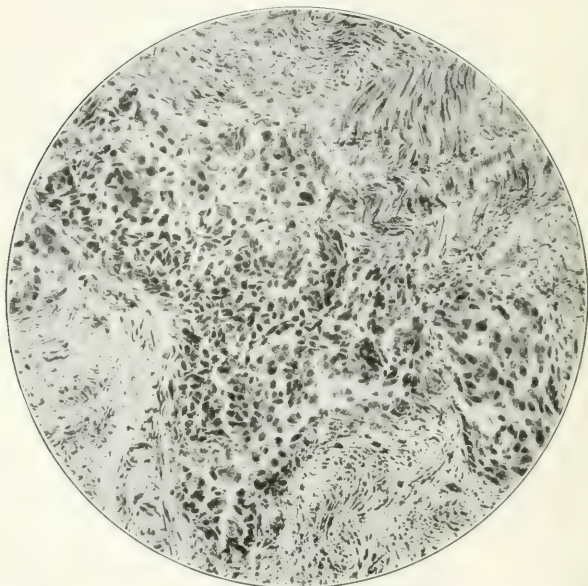


FIG. 9.—Cancer cells broken up. Marked edema. Surrounding muscle structures show distinct nuclei and cell outlines.

Gastrointestinal Tract. Esophagus.—Normal.

Stomach.—Stomach somewhat dilated. Mucosa is thick, has a velvety appearance and is covered with mucus. The mucosa of the remainder of intestinal tract is somewhat edematous and is covered with mucus. Solitary and agminated follicles atrophic.

Appendix.—Appendix presents nothing unusual. Mesenteric nodes present nothing unusual.

Both internal iliac arteries have been tied off just beyond their point of entry into the common iliac. The vessels just beyond the

ligatures are distended with blood. The internal iliac vein on the left side is occluded with a fairly firm thrombus.

Ovaries and Tubes.—Absent.

Uterus normal in size. A median anteroposterior incision dividing the uterus and vagina into halves reveals the following: The greater part of the cervix of the uterus is replaced by an ulcerated surface which encroaches upon and involves the upper part of the vagina. The base of the ulcer is ragged and covered by a greenish-gray sloughing material. Beneath this surface layer there is a grayish-yellow, dry, finely granular, opaque zone measuring on the average, 6 mm. in thickness where the base of the ulcer is formed by the body of the uterus, and diminishing in thickness and gradually disappearing along the sides of the ulcer. Between this opaque zone and apparently normal uterine tissue, there is a narrow congested zone measuring from 3 to 4 mm. in thickness. The endometrium is bluish red in color and edematous in appearance. The fundus of the uterus presents nothing unusual apart from a small intramural fibroid about the size of a hazelnut. A careful inspection of the outer surface of the uterus and vagina after dissecting away the adjacent structures fails to reveal any changes which might be referred to overheating of the structures. In dissecting the uterus from the base of the bladder one passes through cancerous tissue. The bladder wall proper shows no macroscopic cancerous involvement.

Films made from the ulcerated surface show an enormous number of bacteria of various kinds, numerous Gram-positive cocci and Gram-positive and Gram-negative bacilli of various sizes and shapes.

Concerning the actual cause of death in this case, there is some doubt. The most probable diagnosis is sapremia or toxemia, which accords with the symptoms of intoxication observed during life. Of the internal organs, the heart shows the most marked changes which might be attributed to the action of toxic agents.

Microscopical Examination of Uterus.—Proceeding from the center toward the periphery five zones may be observed:

First, an area of necrosis of all the tissues—the eschar.

Second, an area of seminecrotic carcinoma and connective-tissue cells, there is a moderate degree of edema in this region and there is a very marked infiltration of polymorphonuclear leukocytes with a relatively small number of mononuclear leukocytes. This is the zone of inflammatory reaction.

Third, areas of carcinoma nests and muscular tissue. Here the greatest variation of degree and type of reaction to the heat exists. In places there are nests of well-organized carcinoma cells surrounded by smooth muscle fibers that have lost their nuclear stain and are infiltrated with edema—other areas show carcinoma cells and muscular cells in equal stages of degeneration, while still other areas show nests of carcinoma cells separated by edema—with indistinct cell borders, and poorly staining nuclei. Numerous polymorphonuclear cells are seen in these nests, while the surrounding smooth muscle cells seem very little affected. These various areas are so interspersed that it is difficult to explain why in one area

carcinomatous cells are more injured than the muscular cells, and in others the muscle cells seem to have received the bulk of the injury. In this area the capillaries are everywhere engorged with blood.

Fourth, an area of edema occurring in the region of the arcuate arteries at about the junction of the outer and middle thirds of the muscular walls of the uterus. The arteries are shrunken and are only partly filled with blood, the veins are distended, the edema in this region is very great. The smaller blood-vessels show hyaline degeneration of their walls and the tissues in immediate proximity.

Fifth, muscular tissue distended by edema but otherwise uninjured, the edema extends to the peritoneum.

Microscopical sections of the internal iliac vein show thrombosis, careful search of a section stained by Gram method failed to reveal any bacteria. There is a slight infiltration of the clot by leukocytes.

The liver shows evidence of acute congestion. The kidney shows parenchymatous degeneration. Blood cultures taken from spleen were sterile at the end of forty-eight hours.

Conclusions.—There is a mortality associated with the Percy operation. The author's case died with symptoms pointing toward a severe toxemia, and as the autopsy revealed no lesions due to error in technic, the cause of death must be attributed to the operation itself.

A patient undergoing this operation is under the influence of the anesthetic from one to two hours. She frequently suffers from shock and the postoperative course is usually associated with a rise in temperature to 103° to 104° F. for several days. Salpingitis, pelvic abscess, and peritonitis are occasional complications. If the neoplasm has involved the bladder, a vesicovaginal fistula may occur.

As a therapeutic agent, the Percy operation must be considered with radium and x-ray. It is unfortunate that no definite figures showing the postoperative results of a large series, have been published. Until this is done, it is impossible to compare its end results with those derived from treatment with radium and x-ray.

Percy claims that it stops the hemorrhage and offensive discharge. He even thinks a few cases will go as long as five years without a recurrence.

If the patient survives the operation, the sequelæ are not severe, on the other hand, while there is no immediate mortality to radium, there are occasionally distressing, late complications such as severe rectal tenesmus, proctitis, and rectovaginal fistulæ. Radium workers are most enthusiastic in regard to the results of treatment, and time alone must decide the relative value of the three procedures.

The main facts concerning the findings from the microscopical

examination, may be summarized as follows: Certain islands of cancer cells show advanced degenerative changes, reaching in many instances, stages of necrosis and disolution. Others show milder grades of degeneration, and still others have apparently not been affected by the treatment.

The latter cells have all the appearances of viable carcinomatous structures, but concerning the ultimate fate of even these well-preserved cells, I do not wish to commit myself.

The intervening structures (I refer to the musculature and connective tissue surrounding the island of cancer cells) have not wholly escaped injury. I wish to make a special point of this factor, because in reading over Percy's article, I was led to believe that the connective-tissue structures escaped injury almost entirely. My own observations, made it is true, on a single case, do not support this contention. No claim is made that this controverts the excellent experimental work of Haaland, Clowes, and Loeb, and the findings observed by some x-ray workers.

In a case such as this, too many extraneous factors must be considered such as: First, the difficulty of determining the viability of the cells by their microscopic appearance. Second, the uncertainty of knowing the exact temperature of the cautery, and third, the influence exerted by infection, must be considered.

The author wishes to thank Drs. Pool and Isler for the privilege of reporting this case.

8 EAST FIFTY-FOURTH STREET.

THE SIGNIFICANCE OF SYPHILIS IN OBSTETRICS.*

BY

WM. D. FULLERTON, PH. B., M. D.,

Cleveland, Ohio.

(With four illustrations.)

THE great importance of the rôle played by syphilis in the frequent tragedies of reproduction, is only imperfectly understood and not fully appreciated by even the most capable of medical investigators. The negligible understanding or appreciation by the immense audience of mankind for these tragedies is almost entirely due to their ignorance, for which we, the medical profession at large, are primarily responsible.

The position of the medical profession as guardian of the public's health, is the highest, most responsible and exacting, with which

* Read before the Cleveland Academy of Medicine, Jan. 7, 1916.

any body of men could be honored. That this position carries with it a vastly greater obligation than merely administering to those who are already ill is clearly realized by both physician and public. This is made evident by the great work being done by the medical profession in preventive medicine, which includes research and experimental work, public hygiene, the recent marked attention paid to occupational diseases, etc., in all of which labors they are given the coöperation and means, not only of a few far-seeing institutions and philanthropists, but of the public at large, through the approval and support of their civic and state legislative bodies.

To insure public health and lower mortality, an enormous amount of work is being done in obtaining better water supplies, pure food, better milk, proper sewage disposals, reducing or eliminating occupational and parasitic diseases, confining contagious diseases, and reducing infant mortality through teaching activities and the very efficient social service workers. In all of these vital movements the medical profession has proven its efficiency in combating existing detrimental conditions, and it is therefore singular, that it has done so little toward diminishing the ravages of this noxious disease in conjunction with pregnancy, during which period it is particularly pernicious.

The failure of physicians to give the public a comprehensive understanding of the significance of syphilis in reproduction is due in part to their reluctance in speaking of either subject in public, and to their timidity in questioning their patients on the possibility of syphilis being the cause of disaster. The public is rapidly overcoming any false modesty or prudishness in this regard, as is evidenced by the popularity of such plays as Brioux's "Damaged Goods," and, as to the patient, the physician having secured her confidence may with tact almost invariably enlist her aid in working out a correct diagnosis. It is of course essential that the physician realize the prevalence and significance of syphilis during pregnancy, and that he be familiar with the more usual signs, symptoms and means of diagnosis, which he should constantly look for and apply in his obstetric practice.

Judging from my own observations and those of others, I feel that many physicians do not realize the gravity of the situation, and that they frequently overlook pathognomonic evidence of the disease, which if always borne in mind, would explain many of their undiagnosed cases and change their diagnoses in many others.

It is my purpose therefore, though I claim nothing new, nothing original, to put before you as briefly as possible a few reliable facts

regarding the association of syphilis and pregnancy, which I trust may be of some use to all of you, and of great use to some of you.

The subject can be more comprehensively presented under the several subheadings which I shall make, and concluded with a few suggestions which, if followed, will aid in decreasing the prevalence of this wide spread obstetric complication.

EFFECT OF PREGNANCY ON THE DISEASE.

When a woman acquires syphilis during pregnancy, the initial genital lesion, because of the increased vascularity, is usually larger, more moist, softer, and more persistent, often lasting for twelve weeks. Although the so-called secondary manifestations are frequently scarcely noticeable (1), (2), they may develop earlier, and be more pronounced than usual, the papules being larger, and the pustular forms being more common at this time (3). The secondaries on the vulva are the most pronounced; they are larger, more persistent and prone to ulcerate. The constitutional symptoms are more pronounced; the glandular enlargement is more marked; fever is more common and slightly higher; and anemia and digestive disturbances of a more severe degree are met with. Unexplained neuralgias are common.

Tertiary syphilis is less affected by pregnancy than are the early stages, although exacerbation of symptoms are common, quiescent lesions may light up, and negative Wassermann test become positive where there is no question of reinfection (which I believe to be questionable at any time).

It is now quite well agreed that syphilis must be active to give a positive Wassermann reaction, and that a negative reaction does not rule out a specific infection or indicate a cure. Accumulating clinical experience shows, as Keys(4), Nonne(5), Boas(6) and others have recently emphasized, that the Wassermann reaction is not always reliable; a positive reaction, however, being more valuable as an indication of the presence of syphilis than is a negative reaction as marking its absence. This is particularly true of pregnant women, who, before or early in pregnancy may give a strongly positive reaction, and who without treatment, frequently give a progressively weaker reaction as they approach term, about which time they may give a negative reaction, and then within a few months following delivery the reaction may again become strongly positive.

EFFECTS OF THE DISEASE ON PREGNANCY.

Without question syphilis is the most common disease met with during pregnancy. The frequency of its occurrence is difficult

to estimate from the meager statistics on the subject, but from a study of 10,000 consecutive cases, Williams(7) shows its presence in over 3.5 per cent. between the seventh and tenth month, and this figure would probably be increased to 5 per cent. if earlier and later cases were taken into consideration.

Mall, Pearson and others, estimate that for every 1000 live-born children there are 500 to 600 stillbirths; that is, products of gestation expelled between the time of conception and the period of viability (seventh month), or at a later period if born dead. (These figures include very few, if any, induced abortions.)

Syphilis is one of the most frequent causes of abortion and premature labor, 42 per cent. according to Morrow, and when such terminations, especially the latter, are noted repeatedly in the same patient, syphilis should always be suspected. The more recent the infection and the more virulent the disease, the earlier is the pregnancy interrupted. Frequently each succeeding pregnancy progresses a little closer to term before interruption, the women finally giving birth to a full-term syphilitic child which usually dies in infancy, and eventually to a child apparently normal, which may or may not show the disease at a later period(8).

When the disease was contracted many years previous to, or late in the pregnancy, the effects on the pregnancy and the fetus are less pronounced, and more often absent than when infection occurred nearer the time of conception. Here it might be well to mention that Müller(9) has noted that only 15 to 20 per cent. of untreated women who bore luetic children some years ago, give positive Wassermanns.

Syphilis is a common cause of sterility in either the male or the female, Nonne's material(10) showing a 10 per cent. sterility in syphilitic unions; where the graver lesions, as paresis, are present, Haskell(11) has reported a 45 per cent. sterility.

In eighteen syphilitic families Fournier counted 151 pregnancies of which 85 per cent. ended in stillbirths, and Lepileur has stated that the stillbirths in 130 women were increased from 3.8 per cent. before infection, to 79 per cent. after infection. In Baltimore, syphilis was found by Williams(7) to be the most common cause of fetal death of children born after the seventh month and dying within two weeks after birth. Of these deaths 26.4 per cent. were due to syphilis. Slemons(12) on the Pacific Coast has recently confirmed these figures. If we consider the premature children alone, syphilis was the cause of 40 per cent. of their deaths. These figures do not include macerated fetuses, of which fully 80 per cent. are generally admitted to be syphilitic.

Labor is not materially influenced by syphilis. The contractions are sometimes poor; abnormal presentations are more common because of the prematurity and frequent fetal maceration; induration of the cervix from primary or secondary lesions may retard its dilation; friability of the perineum is more marked and is increased by vulvar condylomata; however, the smaller size of the children and ready healing of wounds, fully compensates for these occasional complications due to syphilis.

MATERNAL SYPHILIS.

Luetic women contribute to the frequent sterility of their union through both ovular and endometrial changes, though these cannot be specifically differentiated. Ovarian function would seem to be continued, but in all likelihood either the ovum is liberated from the Graafian follicle in an unfertilizable condition, or, escaping this change, it is fertilized, but on reaching the uterine chamber finds the endometrial bed unsatisfactory for its implantation.

The nearer the time of conception the woman acquires her lues the more certain is her child to be syphilitic and either aborted, born prematurely, or at term with evidence of the disease. Even though the mother acquire her infection in the last month of pregnancy, according to Finger (13), her child acquires the disease before birth in over half the cases. In Fournier's private practice, 44 pregnancies in as many women affected with recent syphilis, resulted in 43 fetal deaths. He also states that 90 women infected by their husbands became pregnant in the first year of married life, which he terms *l'année terrible* from the viewpoint of heredity, of these, 50 pregnancies terminated by abortion or stillborn infants, 38 in the birth of children which soon died, 2 in the birth of children who survived.

Colles' law, 1837, states that a nonsyphilitic woman may bear a syphilitic child, by which through nursing, she cannot be infected. This would admit of paternal infection of the fetus without maternal infection, a theory to which the majority of recent observers are strongly averse. Among their arguments upholding this objection is the physical impossibility of the spermatozoön containing the Treponema within its head, the latter being three times the size of the former; and also for the same reason, to the mere mechanical transportation of the Treponema to the uterine cavity by the spermatozoön. However, accession to the uterine cavity by the spirochete of the father needs no other explanation than their recognized motility, by which means it can be readily understood, how, on being carried to the upper vagina or cervical canal in the semen (14), it

makes its own further ascent, and infects the mother either directly through the endometrium or indirectly through the placenta.

Among clinical observations showing that fetal syphilis is rarely, if ever, seen without maternal syphilis, is the fact that the mother of a syphilitic child may nurse her infant without showing signs of subsequent infection, whereas the child would certainly infect any nonsyphilitic woman. The explanation of this phenomenon is that the mother is already luetic, although without having shown any secondary lesions, but, nevertheless, infected, as is shown by her Wassermann reaction, which Reitschel (25), Ledermann (26), and others have shown is positive in 75 to 100 per cent. of such women, and also by other immediate or latent clinical evidences of the disease. Such women will subsequently bear syphilitic children engendered by a nonsyphilitic man. These mothers have not acquired immunity, they have contracted the disease, and the finding of latent tertiary lesions and even the spirochetæ themselves in her body tissues and secretions, quite definitely prove this point.

Instances are seen which would tend to show the admissibility of Profeta's law, which states that a syphilitic woman *may* bear a nonsyphilitic child. We have no absolute proof that these children are not infected, but when we are not able to discover in them any signs of the disease, and after years of observation no latent evidences are observed, we conclude that they were not infected before birth. Such cases, however, are comparatively rare and limited to instances where maternal infection was acquired years previous to conception, or else very late in pregnancy, though in the latter instance Finger has shown that over half the children are infected before birth. If the child becomes infected during the last few weeks before birth there may be no clinical manifestations of the disease and the Wassermann will usually be negative, as the time has been too short for either to develop, both, however, will develop at a later period.

Syphilis, unrecognized in the male or female of the second generation, may be conveyed in a marked form to the third generation.

PATERNAL SYPHILIS.

The wives of 50 per cent. of paretics were found by Haskell (11) to be syphilitic and in them the disease usually existed as unrecognized latent lues.

If the father be in the primary or secondary stage of the disease, the wife is almost invariably infected with the consequences stated above.

The greater the period of time between paternal infection, and marriage, the less likely is the husband to infect his wife. Even though the husband is markedly luetic he *may* not immediately infect his wife or beget a syphilitic offspring, and these statements are borne out by the findings of Fournier, that with paternal syphilis the offspring is infected only half as often (37 per cent.), as when the mother alone is infected. This also shows the relative danger of maternal and paternal infection. When both parents are infected the fetal mortality varies from 68 to 100 per cent.

FETAL SYPHILIS.

Syphilis has been ascribed as an etiological factor in spina bifida, hydrocephalus, icterus neonatorum, hemorrhagic disease of the new-born, congenital defects, and so on, but it is probable that the disease is more often coincident than etiological. As previously stated, the syphilitic fetus is usually born prematurely, often still-born and frequently macerated, and these factors alone, when met with, should always arouse the physician's suspicions. Luetic children either stillborn, premature, or at term, commonly show evidences of the disease, among which the following are most common.

The child is underdeveloped for the duration of pregnancy and there is a marked decrease of subcutaneous fat, which gives it a shriveled, wizened appearance. The skin is coarse, dry, drawn, friable and of muddy yellow color. On the flexor surfaces, particularly of the elbows, knees, and groins, the skin is very apt to crack and expose the corium, which, if the child be macerated, is of reddish-purple color. On the palms of the hands and soles of the feet the skin is often thick and glistening, and here especially, are macules and bullæ most frequently seen. Macular and papular cutaneous lesions, reddish-brown erythema of the buttocks and pemphigus are often seen. Mucous patches in the mouth and nose, also around the anus and vulva, and hemorrhages from the mucous membranes, especially the nose, are not uncommon. Fissures of the lips and anus are common. Of the visceral changes the more common are the enlargement of the liver and spleen, the former may equal one-tenth the body weight. In both of these organs there is a marked increase in fibrous connective tissue and a small round-cell infiltration. The liver shows a fatty change of the parenchymatous cells. Ascites is not infrequently met with(15). The lungs are enlarged, heavier than normal, and show an increase in connective

tissue with round-cell infiltration. Frequently their alveoli are more or less filled with desquamated degenerated epithelial cells. There is a marked and characteristic thickening and irregularity of Guerin's line (junction of the epiphysis and diaphysis of the long bones), and of this I might mention that the x-ray will give a very satisfactory picture.

Spirochetæ are found in great numbers in the liver, lungs, heart and great blood-vessels, and failure to demonstrate them in these tissues is due to faulty technic. For most satisfactory demonstration, the tissues should be *immediately* hardened in 10 per cent. formalin, and subsequently impregnated with silver nitrate according to Levaditi's original method.

The syphilitic child may exhibit no lesions at the time of birth but develops them later, usually within eight weeks, the so-called late congenital lues. With this condition, coryza (snuffles), pemphigus and cutaneous eruptions, paronychia, marasmus, restlessness, sleeplessness, mucous patches of mouth, anus or vulva, glandular enlargement, etc., are of the greatest significance.

Raven(16), Boas(6), and Müller(9) have all pointed out that very often new-born syphilitic children give negative Wassermann reactions which later usually become positive. A possible explanation of this fact is that immunizing bodies are not transmitted through the placenta from mother to fetus, neither are such bodies formed by the fetus until about the eighth month(24). Roux emphasizes that this fact should be borne in mind and not lead one to err in making a diagnosis. The percentage of positive reactions increase with the age(17), and the blood should not be taken before the tenth day.

The large majority of syphilitic infants die in early childhood, Hyde reporting that 116 of 121 such children perished within the first year, which figures, however, would seem above the average. Fournier(18), considering all children resulting from syphilitic unions, collected 1500 cases from different sources which gave a fetal mortality of 68 per cent., and of 77 per cent. in 491 of his own cases. In both series all cases were included, even the most favorable.

The child of a syphilitic mother or father should never be nursed by a nonsyphilitic woman, for, although it may show no signs of the disease, it is almost always infected and will infect a healthy wet-nurse. Neither should a syphilitic woman, or the mother of an infected child, act as a wet-nurse, for her milk contains spirochetæ and will infect a healthy child(19). A syphilitic woman may nurse an infected child with impunity for herself and her charge.

Luetic individuals may not show evidences of the disease until it is exhibited as late congenital syphilis, which may be first recognized as late as twenty-eight or forty years according to Fournier and Oppenheim(20) respectively, the maximum number of cases being at ten to fifteen years.

Lack of space forbids discussion of the evidences of late congenital lues, but among the more common I may mention interstitial keratitis, epilepsy, idiocy and imbecility (17 to 60 per cent. as given by different authors), chorea, cardio-vascular disease, skeletal deformities as "saber legs," "scaphoid scapula" and "saddle nose," osteomyelitis, nephritis, perforation of the nasal septum or soft palate, gummata, Hutchinson's teeth, psychopathic disorders, etc.

PLACENTAL SYPHILIS.

Syphilis produces many characteristic, if not pathognomonic changes in the placenta, which, however, may vary in degree, so that although a diagnosis may usually be made without difficulty, occasional cases are met with which are of a border-line type and require the clinical history, etc., to aid in the diagnosis.

In the more characteristic cases the placenta is increased in size for the duration of pregnancy; its normal ratio of one-sixth to one-eighth the weight of the child may be increased to one-fourth or more. The placenta is pale, fatty, edematous and of a yellowish tinge, and if the child be macerated, is dull and greasy in appearance. Pronounced infarction is a common finding. As observed by Frankel(21) in 1873, fresh specimens teased in saline solution show marked changes of the chorionic villi, which exhibit a decreased arborescence, they are thickened and irregular in size, the ends of many villi showing a distinct clubbing, and their vascularity is markedly decreased. (Compare Figs. 1 and 2.) In section, besides the above-mentioned changes, there is seen an increase in the density of the stroma, the cells of which have lost their stellate appearance, are more closely packed, are oval or rounded in outline and resemble connective-tissue cells. The blood-vessels are greatly decreased in caliber by an obliterative endarteritis and an increase in the density of the stroma. (Compare Figs. 3 and 4.) This latter change is often seen in the umbilical vessels, and in both locations is of great importance in the production of the extensive placental infarction so commonly seen, which in turn, at least in part, by diminishing the blood supply, accounts for the poor development and frequent death of the fetus with premature expulsion.

With proper technic, spirochete are not difficult of demonstration in the placenta. As shown by the work of Wallich and Levaditi(22), Schultz(23), and others, they are always present if the child is syphilitic and should always be sought for if there is any question of diagnosis.

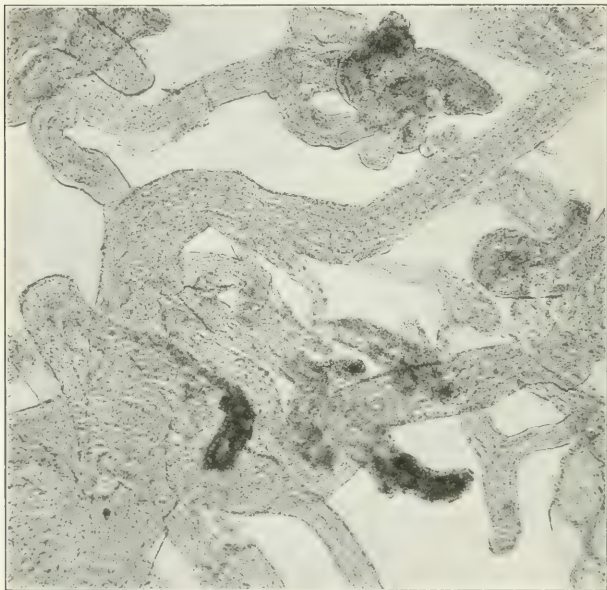


FIG. 1.—Normal placenta at term, fresh specimen teased in normal saline. The villi are uniform and equal in diameter, their ends are rounded and show no clubbing. The tissue is not dense though the vessels are not so distinct as are often seen. (100 diameters.)

TREATMENT.

How soon after infection may a syphilitic marry with reasonable assurance of healthy offspring? Such a question is of vital importance and extremely difficult of a general answer. However, the dictum of pre-Wassermann days, that after five years of the disease during the first three of which he had taken treatment, and during the last two of which he had had no treatment, and shown no signs

of the disease, has proved to Keys(4) and many other observers to be quite dependable. Although the Wassermann is less often positive after such a course, it is, nevertheless, frequently persistent, indicating the presence of active spirochetæ in the body but not their infectiousness. Therefore a persistent Wassermann is not a contraindication to marriage if the above requirements have been fulfilled.

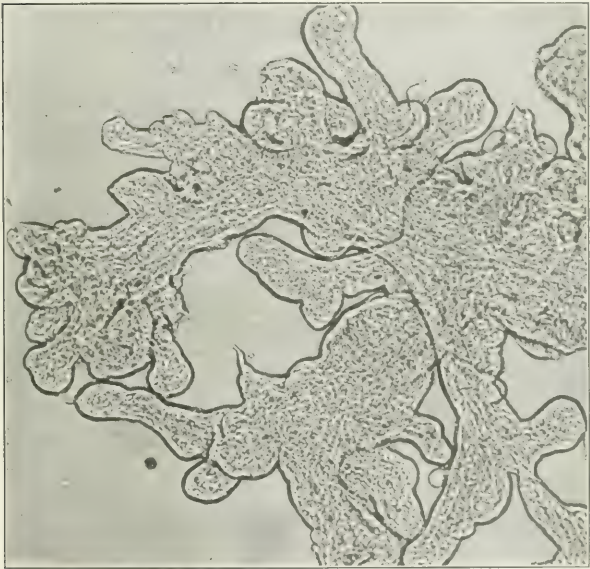


FIG. 2.—Syphilitic placenta about term, fresh specimen teased in saline. There is less branching than in the normal, the villi are irregular in diameter, some being quite thick, and the ends of many are distinctly clubbed. The villi are irregular in outline and so dense that the blood-vessels cannot be seen (100 diameters.)

With active treatment the Wassermann may become negative in the first year of the disease, but this does not mean loss of infectiousness or the permissibility of marriage, as the Wassermann often again becomes positive and clinical observations show frequent infections.

Whenever a history or evidence of the disease is discovered in

either parent, he or she should be put on vigorous specific treatment irrespective of the presence or duration of any pregnancy. The burden of proving the absence of infection in the mate of a syphilitic, is on the shoulders of the physician. Should the mate show evidence or probability of the disease, similar treatment should be administered.

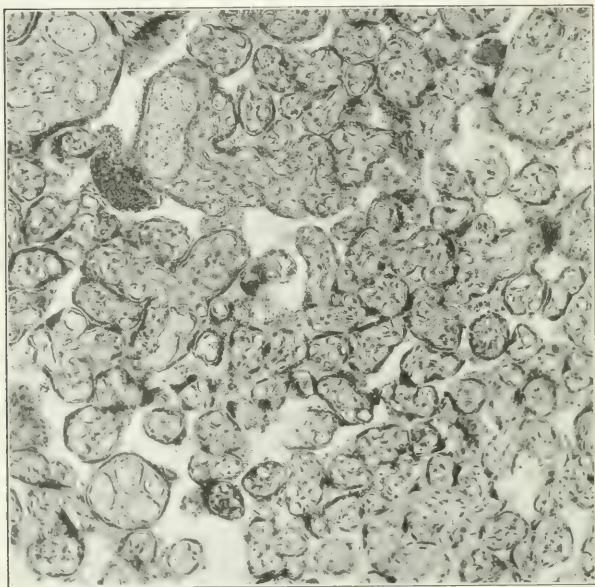


FIG. 3.—Normal placenta at term, celloidin sections stained with hematoxylin and eosin. Note the marked regularity in diameter and the pronounced vascularity of the villi. The stroma is light and reticular in structure. (100 diameters.)

Salvarsan is more particularly useful in cutting short the primary and secondary stages of the disease, but mercury and potassium iodide should always be used for the imperative prolonged treatment.

Fortunately all of these drugs are transmitted to the fetus by the placenta, by which means effective treatment may be administered to the child *in utero*. After birth the child should be treated individually, inunctions of mercury being most satisfactory. The

mother should always continue treatment and nurse her syphilitic child, who will obtain these specific drugs through her milk.

SUGGESTIONS FOR MINIMIZING THE EFFECTS OF SYPHILIS FROM AN OBSTETRICAL VIEWPOINT.

All physicians practising obstetrics should become familiar with the signs and symptoms of syphilis in the placenta, fetus, and young

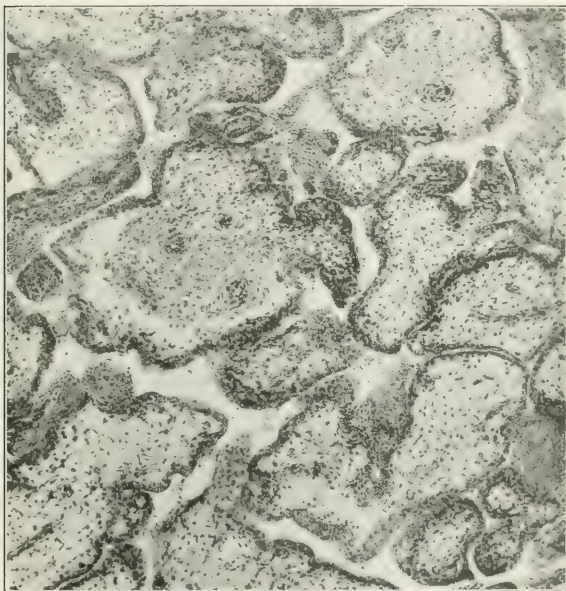


FIG. 4.—Syphilitic placenta showing extreme changes, celloidin sections stained with hematoxylin and eosin. Note the huge irregular villi, their dense stroma of connective-tissue-like cells and the great decrease in vascularity. The blood-vessels show beautifully the obliterative endarteritis. (100 diameters.)

children, as well as with the suggestive histories of the parents of such children. The history of every pregnant woman should be taken as early as possible in her pregnancy, and special emphasis should be laid on her past history relative to evidence of infection, such as genital sore, rash, sore throat, abortions, miscarriage, pre-

mature labor or the birth of children dying in early childhood, or living with evidence of the disease. Whenever infection is in the least suspected, the patient should be carefully examined for evidence of the disease and a Wassermann made. In such cases the husband should also be examined, and if found infected he should be treated.

Every new-born child should be examined and watched for any evidence of infection. Every placenta should be weighed, examined macroscopically, and at least a freshly teased specimen examined microscopically for evidence of the disease.

Especially in all obstetrical clinics, including both hospital and out-door services, the same precautions should be taken, and the careful examination of every placenta, both fresh and sectioned, should be a part of the routine laboratory work. Special staining for the *Treponema* should be done whenever infection is strongly suspected, and thorough autopsies, whenever available, would be most instructive.

Every case showing evidence of the disease either before or after labor, should be impressed with the importance of continued treatment. Charity cases should be referred to a free dispensary for treatment and if they do not report regularly, the visiting nurses or social service workers should exert their influence, enforced if necessary by civil authority, to compel these patients to take treatment.

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VAGINAL-SUPRAVAGINAL HYSTERECTOMY.*

BY

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(With two illustrations.)

THREE conditions are recognized at present in which vaginal-supravaginal hysterectomy is indicated.

1. For the removal of the products of conception during the first four months in tuberculosis of the progressive type.
2. In the presence of fibroids or general fibrosis of the uterus where the Wertheim-Schauta operation for prolapsus uteri cannot be done on account of the large size of the uterus.
3. For uterine hemorrhage which endangers life; in order to definitely check the loss of blood with least trauma and least danger to life.

Martin, in 1899, unintentionally performed this operation while doing a myomectomy through the posterior culdesac. H. W. Freund(1) in 1902, did the operation by chance extraperitoneally, as it is done from above to-day. His first case was a unipara with a soft myoma the size of a child's head. The uterus was retroflexed, with severe psychic disturbance, the patient being most rational during menstruation. Posterior colpotomy showed the tumor to be a ball myoma involving the entire thickness of the uterine wall. The upper portion of the fundus had to be removed, leaving a few centimeters of it above the internal os. The intended myomectomy resulted in a supravaginal hysterectomy, but the stump was not covered with peritoneum. The second case was a tripara, forty years of age. The uterus was large and he amputated the body with the adnexa in the classic manner, covering the cervical stump with the bladder.

* Read before a meeting of the New York Academy of Medicine, February 24, 1916.

In July, 1908, H. von Bardeleben(2) decided, in a case of pregnancy with progressive tuberculosis, to cut an elliptical portion out of the top of the fundus, taking away most of the placental site leaving only a few centimeters above the internal os. He then closed the uterine wound with five or six interrupted sutures, fastened the bladder on the posterior surface of the vaginal wound in the usual manner.

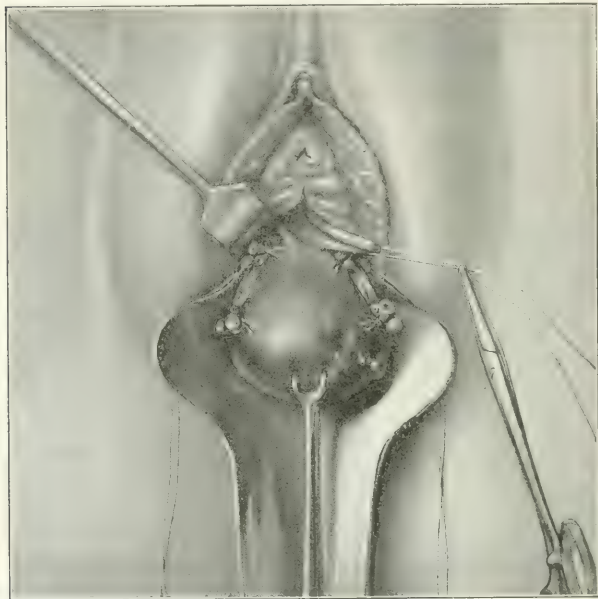


FIG. 1.—Appendages and uterine arteries tied. Loop about utero-sacral held by forceps.

He bases his indication on the observed fact that ordinary abortion, with or without sterilization produced on women with progressive tuberculosis—the cases being followed for a period of sixteen months—gave a mortality of 8 to 53 per cent., while with amputation the same class of cases gave a mortality of only 5 to 6 per cent. during the same period.

In the Wertheim-Schauta operation the uterus has to act as a

supporting wedge in the urogenital diaphragm. The success of the operation does not therefore depend entirely on the correct technic of the fixation but also on the size of the uterus. Stöckel(3) says that under ordinary conditions he has never found the uterus too large. In case of fibroids he, with many American operators, prefers to do a hysterectomy and utilize the broad ligaments as the support for the

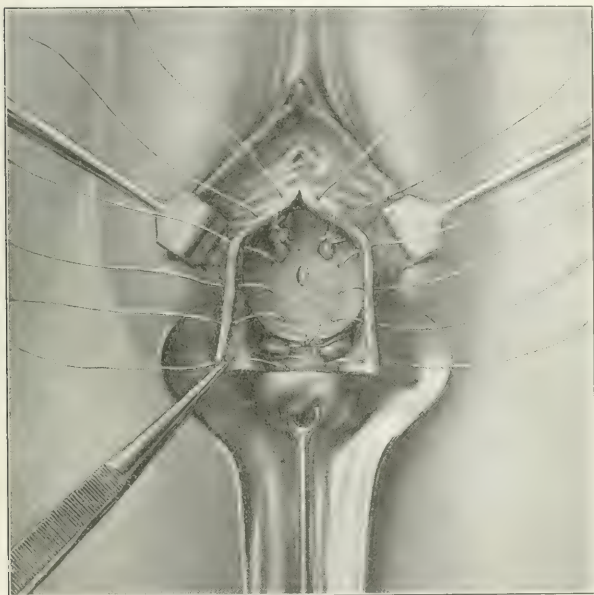


FIG. 2.—Showing stump of uterus with stitches introduced ready for closure of wound.

bladder and vagina. This latter procedure undoubtedly prolongs the operation considerably.

The Pfannenstiel wedge resection is frequently accompanied by oozing of blood, necessitating drainage. In a number of cases secondary hysterectomy has had to be resorted to to check the bleeding.

Alfred Lowitt(4) reports from Fleischman's clinic eight cases of vaginal-supravaginal hysterectomy with satisfactory results. Vineberg(5) has operated on a number of cases. Rieck(6) of Altona-

Hamburg and Fueth(7) report good results in preserving menstruation, leaving a few centimeters of the endometrium above the internal os in that class of young women who after all kinds of treatment bleed persistently and are doomed to hysterectomy no matter what the cause of the bleeding may be—myoma, metritis, arteriosclerosis, neurosis, or ovarian dysfunction. We all know patients who hardly have time to recover from the loss of blood from menstruation to menstruation.

In the most severe cases hysterectomy may be absolutely indicated but in the moderately severe cases, and they are the most frequently met with, we are loath, and rightly so, to induce a premature climacterium.

The production of the cessation of menstruation is looked upon by various operators according to their radical or more conservative inclination. Statistics are not conclusive. Without considering the complaints made voluntarily by the patient, or elicited by our direct questioning, there is a fine psychical and physical process connected with menstruation which we cannot explain by our studies and which perhaps the women themselves are not conscious of. A woman without menstruation is not considered as of full value, either by men or women, and no one knows whether such a young woman develops in a different manner, leaving out of consideration the changes in her true feminine thought and sensation, from those who are in possession of their given functions. It is therefore wise to cure the woman of the excessive bleeding with preservation of the menstruation. This is best accomplished by leaving about 2 centimeters of the fundus above the internal os.

Rieck recommends that the fundus uteri should be cut off on a slant, leaving the posterior wall longer, so as to give more support to the bladder, otherwise the operation does not differ from the one done from above.

In a case of procidentia a \perp -shaped incision is made in the anterior vaginal wall, the bladder freely separated from the uterus and vagina, the uterovesical fold opened and the fundus pulled down into the vagina, while the bladder is held up with a trowel. The uterosacral ligaments are plicated, leaving the last sutures in each long. A pair of blunt forceps is pushed through the base of the broad ligaments to catch the last suture attached to the uterosacral ligaments and brings them out along either side of the cervix. The bladder is fastened to the peritoneum of the posterior uterine wall at the level of the internal os. The round ligaments and the tubes are then ligated and divided, or, if necessary, the ovaries and tubes can be

entirely removed. The broad ligament is pushed down and the uterine artery tied at the side of the uterus and as much of the fundus is cut off as is necessary to make it fit the gap comfortably. Now suture the round and broad ligaments to the stump of the fundus, trim the vaginal flaps and suture the vagina along the entire anterior wall of the uterus. Tie the two sutures that hold the uterosacral ligaments in front of the cervix and conclude the operation with a good perineorrhaphy.

Illustrative cases:

CASE I.—Mrs. B. S., fifty-eight years old, mother of six children, was admitted to hospital in April, 1914. There was a large cystocele and the cervix, which presented at the vulva, was eroded from pressure of the clothing. The uterus was retroflexed and much enlarged. By keeping the patient in bed for a week, and giving her alum douches, the ulceration was healed and we proceeded with the Wertheim-Schauta operation. The enlargement at the top of the fundus was found to be a fibroid the size of a lemon. The round ligaments and tubes were tied off, the broad ligaments pushed down, and the uterine artery tied at a point 3 centimeters above the level of the internal os. The uterosacral ligaments were plicated and the end sutures caught by a pair of forceps pushed through the base of the broad ligaments and brought out alongside the cervix. The fundus was amputated, the peritoneal edge of the bladder fastened to the peritoneum at the posterior edge of the fundal stump and the operation finished in the usual manner.

On examination, February 16, 1916, the patient considers herself well and the anatomical result is excellent.

CASE II.—Mrs. Sch., mother of four children, was operated upon by me at the hospital, February, 1915. She had cystocele, rectocele, prolapsus uteri with the cervix presenting at the vulva, and a large fibroid retroflexed uterus. As the uterus was too large to allow the ordinary operation the fundus was removed by a slanting incision as described above, and the operation finished as usual. The anatomical and functional results are good.

245 WEST TWENTY-FOURTH STREET.

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ACIDOSIS COMPLICATING PREGNANCY, WITH REPORT
OF A CASE CURED BY TRANSFUSION.*

BY

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A DISEASE which is occupying considerable prominence at the present time in the realms of internal medicine is that of acidosis. It could hardly be called a disease yet its symptom-complex and the intricacies and many ramifications of the problem would certainly deserve such dignified appellation. Literally speaking it can scarcely be called more than a condition or symptom. According to the latest conception it is a state of the blood that has undergone considerable loss of alkaline to neutralize excessive acid products of deranged intermediary metabolism. The acid substances thus formed are unsaturated fatty acids such as diacetic, oxy-beta, butyric and acetone and in all probability lactic acid is also concerned in some of these conditions. Under normal conditions these acids are completely oxidized into carbon dioxide and water. Occasionally the incomplete oxidation product acetone may appear in the urine in small amount. An acid reaction of the blood is incompatible with life. Oxidation can only take place in a neutral or slightly alkaline medium. Hence there is a great effort on the part of the human economy to retain all the available alkali in order to maintain the normal degree of alkalinity of the blood. The symptoms arising in acidosis are due entirely to the withdrawal of the alkaline reserve from first, the blood, and second, from the plasma bathing the cells. The unoxidized toxic products that are intermediary in metabolism occur frequently in children in starvation, diabetes, and to a slight extent in mild fevers. In children the condition is most often met with in cyclic vomiting and has been reported even in endemic form as in Manchester, Vermont. The symptoms as they occur in children may be divided into two stages: First, they are excited, restless, flushed and have recurrent and persistent vomiting, which is unrelieved by the usual methods, high fever, and acetone odor on the breath. The second, or paralytic stage, there is dyspnea, deep sighing, respiration first

* Read at a meeting of the New York Obstetrical Society, February 8, 1916.

is rapid, becomes deep and slow with coma, vomiting persists, the abdomen becomes soft and scaphoid. The patient finally dies in urgent dyspnea without cyanosis. In adults, the first stage is usually absent.

For us to-night there is no condition of acidosis that is of more vital interest than that which occurs during or after pregnancy. Liver disease, as we all know, is quite common in pregnancy, and the acidosis appearing in pregnancy must be regarded as a result of deficiency in the activities of the liver. Oxidase ferments are formed in the liver and fed to the blood and lymph. Therefore when the liver is injured, there is a deficiency in this oxidase, and therefore the intermediary products of metabolism make their appearance in the blood stream. Chemical processes take place in the body very similarly to the reactions as they occur in the test-tube and they can be measured with just as much accuracy. For instance, sulphur and phosphorus are constituents of the protein molecules. These elements are acid-forming in character, as sulphuric, sulphonic and phosphoric acids, and in themselves effect alkaline withdrawal for their neutralization. This is, however, counterbalanced by the ammonia radical. The proteins are more directly concerned with the problem in which we are interested at present. In the protein metabolism, uric acid, creatinine, and ammonia are present in the blood in very small amounts. In incomplete oxidation of protein, uric acid and ammonia would be high. This is found to be the case in diseases of the liver. It should be recalled here that in the formation of urea the protein is first reduced to ammonia and is then built up by the liver into urea. Therefore, a large ammonia content in the blood may be regarded as indicating defective liver metabolism. In acidosis the demand for alkalies is so great that the ammonia is withdrawn before it is converted into urea; hence a high ammonia content would speak for an acidosis, and if incomplete protein metabolism should prevail, there would be an accompanying increase of uric acid, and it would therefore be quite difficult to differentiate by the ammonia, uric acid, and urea content of the blood between primary liver disease and acidosis. Where all the constituents are low and the ammonia high, it would point to an acidosis. The degree of acidosis is best measured by Van Slyke's method of determining the carbon dioxide absorption capacity of the blood plasma. The clinical picture in acidosis varies not with the amount eliminated but with the amount of acid substances retained. Hence a urine loaded with acid products may give rise to little or no clinical

manifestations. On the other hand, in spite of large eliminations, there may be large retention, with marked clinical signs. A urine with a small amount of acid bodies may give rise to profound clinical symptoms because of the marked retention. In acidosis the kidney function is also interfered with and this in turn adds to the clinical complexity of the case. Having analyzed our problem in a general way the vital question for us and the patient is what therapy can we offer for the alleviation and cure of the patient? The chief alkalis concerned in the neutralization of the acid bodies are sodium, potassium and calcium, sodium being the most important. Sodium carbonate, for this reason, has been the substance administered and this has been given by the mouth, rectum, and in severe conditions, intravenously. This sodium carbonate merely neutralizes the acid bodies but does not prevent the continued development of them. When given by mouth, it is often vomited and if there is persistent vomiting, as often occurs, it cannot be so given. By rectum, it is irritating. Hypodermoclysis of alkali chars the tissues. The intravenous method while rapid is not free of dangers. Some of the bicarbonate of soda is rapidly converted into carbonate. The presence of an excess of sodium carbonate may jell the blood even though the administration be very slow.

When one considers that the amount of alkali in the circulation is directly proportional to the amount of plasma, any increase of plasma would concomitantly furnish increased alkaline capacity. Hence blood transfusion deserves respectful consideration for this condition. In blood transfusion the plasma content not only is increased but the oxygen carrying capacity and oxidizing ferments are also increased. The introduction of such blood is further enforced by preceding alkalization of the donor. The absorption of two intestinal tracts is obtained for the patient instead of one. It requires little stretch of the imagination to perceive that in such procedure we introduce alkali in an available form to the patient. We increase the alkaline and oxygen capacity of the patient. We furthermore increase the oxidizing ferments which will go a great way in preventing the presence of the acid substances in the blood. Having constructed for you the basis of our work it is my privilege this evening to present the cure of one case based upon this structure.

Clinical History.—Mrs. M. D., aged twenty-four, one of five children who have attained maturity. Grandfather and father marked diabetics. Unusually intellectual and highly nervous

temperament. Married May, 1914, and became pregnant following the next menstruation. Almost immediately after conception she began to be nauseated and vomited so frequently that the case was diagnosed as one of hyperemesis gravidarum. She was advised by a noted obstetrician in London to have pregnancy terminated. This was refused and after being under constant medical care for four months, she returned to America and came under my observation. The whole period of gestation was marked by excessive digestive disturbances and while at no time were there definite nephritic symptoms, a varying amount of acetone and diacetic acid presented in the urine. No blood analyses were made.

In March, 1915, she was delivered approximately at term with normal labor and very small amount of chloroform of a normal child. Great care was exercised in the artificial feeding of the child but there have been symptoms akin to those observed in the infants with cyclic vomiting and a mild acidosis has been present.

The patient began her second pregnancy September 1, 1915, five months after the birth of her child. The first month no untoward symptoms developed and the urine was normal. The beginning of the second month acetone and diacetic acid were noted in the urinary analysis and vomiting began. Her weight at this time was 122 pounds and during the course of her pregnancy and following illness she lost 24 pounds. During October, 1915, attention was directed to the treatment of acidosis by means of alkalies and colon irrigations, but without effect and as the pregnancy advanced the vomiting became more and more excessive and none of the usual means employed in cases of hyperemesis gravidarum gave any beneficial results. It is to be noted that thorough examinations failed to find any abnormal condition in the pelvis and that the urine contained no albumin or other indications of any lesion of the kidneys. Hoping to tide over the duration of pregnancy until into the third month, rectal alimentation was resorted to, as was a hypodermoclysis of dextrose. The patient at this time presented a picture of emaciation and profound toxemia, yet had practically a normal pulse and never any fever or subnormal temperature. On November 12, the thirteenth week of pregnancy, after consultation with Dr. E. B. Cragin, the uterus was emptied. This abortion was followed by no symptoms of any change in normal constitutional condition nor did it have any effect upon the vomiting even though considerable blood was lost and Murphy drip used.

We now began the blood analyses and because of the conditions there shown, decided to employ the syringe method of transfusion. This was done by Dr. Edward Lindeman, who, after making thorough tests of the blood of twelve donors in an effort to find a blood compatible to that of the recipient, chose the husband of the patient. For twenty-four hours before the transfusion, he, the donor, was saturated with large doses of bicarbonate of soda. November 26 the transfusion was accomplished with no discomfort to the donor and never have I seen such a miracle as was presented immediately

MRS. D., LABORATORY RECORDS.

Urine	Reaction	Sp. g.	Albumin	Sugar	Acetone	Diacetic acid	Indican	Urea, per cent.	Microscopical
10/ 5/15	Faintly acid	1009	Absent	Absent	Absent	Absent	Trace	0.6	Considerable epithelia; few leukocytes.
10/13/15	Neut.	1008	Absent	Absent	Absent	Absent	Absent	0.6	Few epithelia, leukocytes and calcium oxalate.
10/19/15	Consider. acid	1020	Faint trace	Absent	Faint react.	Faint react.	Absent	0.9	Considerable epithelia and leukocytes.
10/22/15	Faintly acid	1015	Absent	Absent	Faint react.	Absent	Absent	1.2	Considerable epithelia and leukocytes.
10/25/15	Consider. acid	1030	Faint trace	Absent	Marked react.	Marked react.	Absent	2.5	Considerable phosphates, urates and epithelia.
10/29/15	Faintly alk.	1026	Faint trace	Absent	Faint react.	Faint react.	Absent	2.2	
11/ 5/15	Alk.	1020	Absent	Absent	Marked react.	Marked react.	Absent	1.7	
11/ 8/15	Alk.	1020	Absent	Absent	Marked react.	Marked react.	Marked	1.4	Abundance of epithelia.

Urine	Reaction	Sp. g.	Albumin	Sugar	Acetone	Diacetic acid	Indican	Urea, per cent.	NH ₄ , per cent.	NaCl, per cent.	Micros. exam.	Blood
11/22	Acid	++	+	—	++	++	—	1.2	0.072		Pus +++	—
11/23	Acid	+	+	—	++	++	—	1.3			—	++
11/24, Before transfusion	Acid	+	+	—	++	++	—	0.5	0.053		—	+
11/20, After transfusion	Acid	+	+	—	++	++	—	0.21	0.037		—	+
11/20, 5 P. M.	Alk.	+	+	—	++	++	—	0.34	0.0004		—	+
11/30, 10 A. M.	Alk.	++	+	—	+	+	—	1.0	0.25		—	+
12/2, Before transfusion	Alk.	++	—	—	—	—	—	0.9			—	+
12/2, After transfusion	Alk.	++	—	—	—	—	—	1.2			—	+
12/6	Acid	+	—	—	—	—	—	1.0			—	+
12/10	Acid	+	—	—	—	—	—	2.8	0.016	0.25	—	+
Normal average								2.0	0.07			

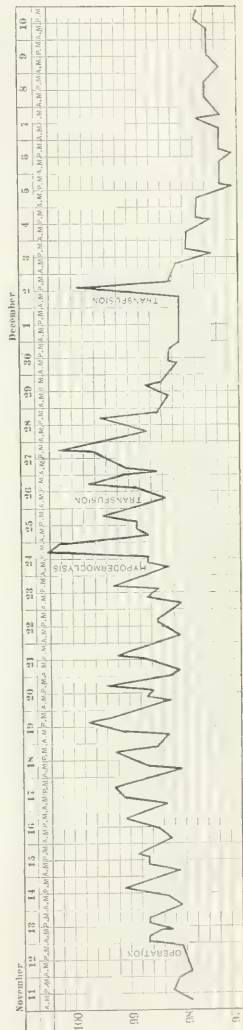


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in the condition of the patient. She, who a few minutes before had been lethargic, with gray ashen facies and waxy fingers, became interested in everything about, the pulse completely changed its character, and with moist tongue and pink lips she asked intelligent questions.

The transfusion was done at 12.30 P. M. by drawing 400 c.c. of blood from the patient; 1100 c.c. was then transfused from the husband (donor) to patient, together with 300 c.c. of Lock's solution. Beginning two hours after transfusion, patient was given one of the predigested foods and continually after that nourishment was administered every two hours and soda solution introduced into the rectum every four hours. The patient vomited but three times in the next twenty-four hours and after that was able to take the prescribed diet and one of the iron preparations. December 2 another transfusion was done with same donor, in the same manner as above, except 760 c.c. was given and a relatively small amount of Lock's solution.

Blood tests made at frequent intervals have shown the blood free from acidosis and, except for a mild secondary anemia, is normal. Convalescence has been progressive and the patient is now able to do most of her usual avocations.

BLOOD	MILLIGRAMS PER 100 C.C. OF BLOOD.						
	UREA	URIC ACID	CREATININE	NH ₃	NA CL	SUGAR	CO ₂ ABSORPTION % OF PLASMA
11/22	9.00	BEFORE TRANSFUSION				50	55%
11/26	9.00	1.3	0.3		0.66%	77	
11/29	10.4	AFTER TRANSFUSION	0.3	1.50	0.46%	80	94%
12/20	32.	1.4	0.8	.200	0.58%	33	88%
NORMAL AVERAGE	12--16	1--3	1--4	4--9	.60	60--110	65%--95%

In considering the figures in the above table, the story is even more striking than the statements of the clinical course. The blood before transfusion runs low. A low blood urea is characteristic of a patient on a starvation diet. Before transfusion there was persistent vomiting and inability to take protein food stuffs. After transfusion, vomiting ceased, concomitantly there was increased ingestion and tolerance of protein food stuffs. This was followed by an increase in blood urea. On December 20, a month after transfusion, the blood urea had increased to 32 milligrams per 100 c.c. volume, which is three times the amount present during the starvation period. The patient was considerably emaciated because of her starvation. She was put on a high protein diet and began to gain weight rapidly—hence the high nitrogen figures of December 20.

The uric acid figures fall within the normal limits.

The creatinine may also be regarded within normal limits.

The blood ammonia unfortunately was not determined before transfusion, but we have reason to suppose that it was quite high. Three days after transfusion it was practically twice as high as the

upper limit of normal. On this day the urine for the first time is alkaline, although the acetone bodies were still present. The high ammonia in the presence of low protein diet must be explained in one or two ways or both.

I. The ammonia from endogenous metabolism is drawn upon to neutralize acid before it can be built up into urea by the liver.

II. The liver may be so diseased that it is unable to build up into urea the amount of ammonia that is offered to it.

III. Both factors may prevail.

On December 20, though the patient was on a high nitrogenous diet, the blood ammonia was below normal, the actual quantity approximating one-half the lower limit of normal. The urea at the same time was high. These relative figures are indicators of good liver function.

The sodium chloride shows no change worthy of comment.

The blood sugar before transfusion, which is, you recall, the starvation period, is a little low. Whatever food the patient was able to tolerate before transfusion was in the form of carbohydrate. Immediately after transfusion all food stuffs were well tolerated, the diet was increased and the blood sugar had increased concomitantly, well within the normal limits.

Fats were not included in the diet.

On December 20, one month after transfusion, the patient was on a high protein and low carbohydrate diet. At this time the blood sugar runs very low approximating one-half the lower normal limit.

The most important and perhaps the most interesting figures in the table are those of the CO_2 per cent. content of the plasma.

The available alkali of the blood is in the form of sodium bicarbonate and is present practically in its entirety in the plasma. Van Slyke has recently developed a simple method for the determination of the alkalinity of the blood, by the estimation of the amount of CO_2 gas that can be liberated from the plasma.

It has been found that where the CO_2 content of the plasma is below 65 per cent. the patient develops a state of acidosis. Above 65 per cent. no state of acidosis prevails.

Before transfusion, in the case under discussion, the CO_2 plasma content was 55 per cent., after transfusion the plasma content of CO_2 gas was 94 per cent. This marked increase cannot be regarded in the light of simple law of averages after transfusion, because the normal average is between 55 per cent. and 95 per cent. One must conclude that something more than an averaging of the alkalinity of two mixtures had taken place.

CONCLUSIONS.

First.—That besides the generally accepted routine of frequent urinary analyses during the whole period of pregnancy, in private cases, this should be supplemented by the analyses of the blood as being a more accurate test to elucidate the actual condition of the patient.

Second.—That not only should blood of the donor and recipient be compatible but, as illustrated by this case of acidosis and the first time so far as known of its employment, the blood of the donor should be alkalized by large doses of bicarbonate of soda before transfusion.

Third.—That by the method of syringe transfusion we have a comparatively simple and safe means of treatment which produces results not found with other known methods.

Fourth.—That the timely use of this treatment may obviate the necessity of emptying the uterus in cases of acute and severe acidosis complicating pregnancy.

Fifth.—It is possible that with this method of treatment employed not only in the severe type but in the lesser grades of acidosis of pregnancy, we may do much to lessen the number of marasmic infants whose mortality and morbidity is so great during the first months and years of life.

A REPORT ON THREE CASES OF LABOR FOLLOWING VENTRAL SUSPENSION.*

BY

WM. E. CALDWELL, M. D.,

New York.

THE deliberate fixation of the uterus in the child-bearing woman without sterilization is seldom or never done by careful operators. Fixation of the uterus in the majority of cases now seen by obstetricians has followed accidentally after various operations. Suspension of the uterus, even with good technic, ends so frequently in fixation, that Williams, so long an advocate of this operation, has given it up. G. W. Kosmak read a very complete paper before the New York State Medical Society in 1914, reviewing the entire subject and reporting several fixations which followed different operations for the correction of the misplaced uterus.

The great number of abortions, bladder disturbances, and painful pregnancies which follow fixation, are well discussed in recent literature. Postpartum hemorrhage is a constant danger. A large number of placenta previas have been reported. The fact

* Read at a meeting of the New York Obstetrical Society, February 8, 1916.

that atypical presentations, especially of the shoulder, occur, is to be expected and is due to the distortion of the uterus.

Long, hard, painful labors, early rupture of the membranes, difficult dilatation of the cervix and early formation of a retraction ring, with a marked thinning out of the posterior uterine wall, very often cause complicated and dangerous deliveries.

Harris, in the *Medical Brief* of St. Louis, vol. xlii, 1914, after a careful review of the literature, and from a series of his own cases, concluded that a majority of polar presentations with the back anterior, either end spontaneously, or with an easy forceps or breech extraction after a long, hard labor.

The unsatisfactory painful labors, the marked thinning out of the posterior wall, with resulting danger of rupture, has caused a great number of the writers to advocate an early Cesarean section in cases where the presenting part cannot be manipulated into the brim, and where the labor fails to make a constant satisfactory advance.

In performing Cesarean section, it is important to carefully separate the adhesions, tying them off and freeing the uterus before opening it, in order to prevent serious hemorrhage. The uterus does not contract well unless the adhesions have been cut. We have witnessed one case where the patient died on the table from hemorrhage under these conditions. Where the adhesions are very dense and there is danger of their re-forming, the sterilization of the woman, or the complete removal of the uterus, must be seriously considered. The danger from vaginal delivery is well illustrated in Case I of the following three fatal cases.

CASE I.—Mrs. S. M.; para-iv; aged thirty-eight; born in Italy. Admitted February 10, 1915.

Family History.—Negative.

Previous Medical History.—Negative.

Obstetrical History.—She has had two full-term, living children, delivered instrumentally, and one miscarriage four years ago at the fifth month. Following this miscarriage, the patient had a constant leukorrhea, frequently tinged with blood, backache, headache, and loss of weight. She was operated on November 10, 1911, at Bellevue Hospital. A curettage, perineorrhaphy and a ventral suspension of the uterus was done. She was discharged twenty-six days later in good condition.

Present Pregnancy.—The patient was under observation in her home for several weeks before she was admitted. Except for a slight albuminuria with a few casts and moderate swelling of the feet, her pregnancy was uncomplicated. The fetus was in the transverse position and although a vertex presentation was obtained

on two or three occasions by external manipulation, it would immediately return to the transverse.

She was admitted to Bellevue Hospital on the night of February 10, 1915, in the fortieth week of her pregnancy with a slight bloody vaginal discharge and having some pains, but they gave so little discomfort that she slept most of the night.

Physical Examination.—Temperature 98.6; pulse 76. Blood pressure: systolic, 140; diastolic, 105. Feet and legs were slightly edematous. Abdomen showed a scar from the symphysis to the umbilicus about 1 inch in width. The abdomen was pendulous and the uterus was firmly adherent to the scar. The uterus was contracting at irregular intervals. Fetal movements were made out and the fetal heart, although indistinct, could be heard. The cervix was high, pointing directly backward and above the promontory; partially softened and dilated to about two fingers. No presenting part could be made out at that time. The diagnosis of the position of the fetus, either by external or internal examination, was not possible on account of the contracted condition of the uterus.

Six hours after admission, after a more careful examination, the uterus was found to be tonically contracted, with a beginning retraction ring. The membranes were ruptured. The cervix was high, pointing directly backward toward the promontory, and there was a dilatation of three fingers. Under an anesthetic, the head and foot were found to be in the lower uterine segment, and since it was impossible to bring the head into the brim, a slow podalic version was done. The cord was not pulsating, but the patient was in good condition so she was allowed to come out of the anesthetic and a tight binder was applied to correct the pendulous condition of the abdomen. In order to correct the direction of the cervix, very slight traction was maintained on the child's foot. The cervix was finally completely dilated, but in spite of very good pains, the child did not advance. Under an anesthetic, a slow breech extraction was then done and the after-coming head was perforated and delivered. Immediately after the birth of the child, there was a copious rush of blood and the patient went into serious shock, the pulse becoming almost imperceptible. The hand was introduced into the uterus and the placenta was quickly removed, after which the bleeding stopped. A rapid examination for rupture of the uterus was made. The cavity above the retraction ring was intact, but a tear of the cervix on the right side was discovered. This was considered at the time to be not enough to account for the serious shock, and it was supposed that some of the adhesions between the uterus and the abdominal wall had given way. A hot intrauterine douche was given and the uterus and vagina were then firmly packed with iodoform gauze. In spite of a saline infusion and other methods of treatment for the shock, the patient did not react and died in a little less than two hours. There was no further external bleeding.

On autopsy the anterior surface of the uterus was found to be firmly attached to the abdominal wall by very dense fibrous

adhesions. There was a cervical tear on the right side, extending obliquely upward for 12 cm., with a hemorrhage into the right broad ligament. A well-marked retraction ring was still present. The tear was below the retraction ring and opened into the broad ligament.

CASE II.—Mrs. C. F.; aged twenty-six; para-i; married. Admitted on March 19, 1915.

Family History.—Negative. No history of venereal disease.

She was operated on in 1908, at which time the right ovary and appendix were removed. She had a second operation the following year for adhesions. She was operated on for the third time on January 12, 1910, at the Woman's Hospital. The latter has kindly sent me the following report of the operation. "Laparotomy; separation of postoperative adhesions. Median incision, cutting out old scar. Many adhesions of the abdominal wall. Right tube and remains of right ovary freed of adhesions. Left ovary cystic, size of almond; not removed. Fundus freed and raised. Many adhesions from sigmoid to the fundus and bladder; these freed with greatest difficulty, requiring a lot of time and care. Serosa torn from sigmoid in two or three places; sutured over with No. 1 plain catgut. Abdomen closed."

She was again admitted to Bellevue Hospital on June 30, 1910 and remained until July 5, complaining of pelvic pains, backache and headache. Again the uterus was found to be bound down by adhesions, but no operation was performed. Apparently she went to two or three hospitals during the five years before she came to us the last time, still complaining of the same symptoms, but was not again operated on.

She was admitted to Bellevue Hospital on March 19, 1915, and from her history was thirty-two weeks pregnant. She gave a history of almost constant abdominal pain since her pregnancy commenced, with frequent and painful micturition, frequent attacks of vomiting, and three or four attacks of bleeding from the vagina. For four hours before admission, she had intermittent and extremely painful "contractions in the abdomen," with vomiting and a slight bloody vaginal discharge. No history of the membranes having ruptured.

On admission, pulse 120, temperature 98.6. Urine showed trace of albumin, but no casts. The patient was fairly well developed and nourished. The heart, lungs, liver and spleen were negative. The abdomen was rigid and tender throughout. Stomach visibly distended, but no marked intestinal distention was found.

The size of the uterus was about the thirty-second week of pregnancy and was contracting at irregular intervals. The fetal heart sounds were very indistinct; no fetal movements were made out. The position was R. O. P. The uterus was adherent to the abdominal wall from the symphysis to the umbilicus by an old scar $1\frac{1}{2}$ inches wide. The pelvis was normal. The cervix was high above the promontory and was directed backward. The external os admitted one finger; the internal os was closed. There was a

slight bloody discharge. No presenting part was made out. The membranes were intact.

The patient was given a quarter of a grain of morphine. She vomited her cathartic and the enema was reported ineffectual. She slept at intervals for the next six or seven hours, when the pains became regular at three- to five-minute intervals and the vomiting and retching became almost constant. The pulse rate varied from 110 to 140. As there was no dilatation of the cervix after fourteen hours of labor, a Cesarean section was decided upon. The length of time that the patient was allowed to remain in labor was due to the fact that the house surgeon did not recognize the serious nature of the case and so did not report it to the attending staff. An incision was made on both sides of the old scar and in dissecting it out, an opening was made directly into the sigmoid which was collapsed and adherent both to the scar and to the uterus. The intestines, omentum, bladder and uterus were bound down by a tremendous mass of adhesions as high as the umbilicus and all landmarks were completely obliterated. In dissecting out the adhesions and freeing the uterus, the gut was still further damaged. After the uterus was freed, an ordinary Cesarean section was performed, and a dead male child, weighing $4\frac{1}{2}$ pounds, was delivered. A simple hysterectomy followed. There was considerable difficulty in controlling the oozing and the patient's condition did not warrant a repair of the gut. Both ends of the cut sigmoid were clamped and sutured through the abdominal wound. The vomiting continued in spite of gastric lavage. There was no movement from the bowel and very little flatus was passed. Her condition became steadily worse and she died about forty hours after the operation.

CASE III.—Mrs. C. B., married, U. S., aged thirty-four; para-ix. Admitted January 14, 1915.

Previous History.—Negative.

Obstetrical History.—She had had seven full-term, normal deliveries. On August 10, 1912, she was admitted to the Lying-In Hospital in severe shock from a premature separation of the placenta. On account of the undilated and sclerotic condition of the cervix, a Cesarean section was performed. A full-term, dead fetus was delivered. The patient made an uneventful recovery and was discharged fifteen days after the operation. She had a temperature of 104 on the fifth day, which came down gradually to normal.

She was admitted to Bellevue Hospital on January 14, 1915. From her history she should have been in the thirtieth week of her pregnancy.

Since the beginning of pregnancy she had frequent sharp, lancinating pains in her abdomen, followed occasionally by vomiting. She had been admitted to two obstetrical hospitals for this reason, but each time was discharged without relief. For the week before admission to Bellevue Hospital, the attacks of pain had been more frequent and she had a slight bloody vaginal discharge and could no longer feel the child.

Physical Examination.—The temperature was 99.8, pulse 100.

The urine showed albumin and hyaline casts. The patient was fairly well developed and nourished. The heart, lungs, liver and spleen were negative. The abdomen was very much relaxed, and there was an old abdominal scar about 10 cm. long, with the center about the umbilicus. There was a tumor mass about the size of a seventh months' pregnancy which corresponded in size to her history. The fetus could be felt apparently directly underneath the skin. It was impossible to map out the uterus, either from above or by vaginal examination. The cervix was hard, sclerotic, and had a bilateral laceration. The internal os admitted the tip of a finger, through which ballottement could be obtained. The posterior wall of the uterus seemed fairly normal. The anterior wall could not be mapped out. The cervix did not feel like the cervix of a pregnant uterus. There was a fetid, blood-tinged discharge from the cervix.

In the hope that the cervix would begin to soften so that it would be possible to deliver through the vagina, the patient was kept under observation from January 14th to the 29th. Twice during this time there was considerable bleeding from the cervix, necessitating packing. In spite of the packing, there were no uterine contractions. The foul discharge continued. From the 20th to the 29th, when she was operated upon, the temperature varied from 100 to 102; the pulse from 80 to 110. There was a leukocyte count varying from 12,000 to 25,000, with a polynuclear count from 80 to 85 per cent.

A laparotomy was done on the 29th. The old scar was dissected out, opening directly into a sac containing a dead, macerated fetus and foul-smelling pus and gas. The sac was adherent to the small intestines, mesentery, bladder, rectum and side of the pelvis. The posterior wall of the sac, at the lower portion, was made up of the uterus; the rest of the sac was composed of fetal membranes and inflammatory adhesions. The whole sac, including the uterus, was gangrenous and was removed with great difficulty and considerable bleeding. Drainage was established through the vagina and abdominal wound. The patient did not react from her operation and died on the following day.

In these cases the fixation of the uterus followed in the

First, a deliberate suspension of the uterus by an excellent operator;

Second, inflammatory changes in the pelvis following repeated operations, and

Third, an ordinary Cesarean section.

The first case bears out what the majority of gynecologists now believe, namely, that the suspension operations of the uterus should not be done during the child-bearing period without sterilization. This case also shows the danger of vaginal delivery in such cases. In spite of a very slow breech delivery, and although the after-coming

head was perforated when it did not descend readily, still the uterus was ruptured.

Case II should have been sterilized at her last operation in 1910, considering the great number of adhesions and the damage which had been done to the sigmoid at that time.

That Case III was a difficult problem in diagnosis is shown by the fact that she had been admitted to two obstetrical hospitals before she came to us and was discharged without operation. The diagnosis should have been made sooner and the operation performed before sepsis had advanced so far.

These three cases came on the service within a few weeks of each other. Seven other cases of complicated labors due to fixation were found in the recent histories of two hospitals and a great number have been reported in the literature, which shows that these cases occur rather frequently and that all operators on the pelvic organs must take greater care in the future to prevent this serious complication to labor, for, in spite of the remarkably few fatal cases reported in the literature, I believe many of these women die.

THE TRAINING IN OBSTETRICS THAT THE STATE SHOULD DEMAND BEFORE LICENSING A PHYSICIAN TO PRACTICE.*

BY

BARTON COOKE HIRST, M. D.,

Philadelphia, Pa.

As good an index as any other, of the civilization of a state, is its law to protect women in childbirth from harm at the hands of untrained physicians.

Wherever the human race has reached its highest development, these laws are intelligently framed, well administered and efficient in attaining their purpose. Descending the scale of civilization they show decreasing knowledge and wisdom until they disappear altogether. Judged by this standard, the United States does not rank high among civilized nations. As might be expected the level of civilization by this test varies in the different States. Some are lower than others, but in none is anything like the same intelligent care taken of that part of the community which most needs protection, as is exercised, for example, in Great Britain, Germany or France.

* Read before the Obstetrical Society of Philadelphia, March 2, 1916.

In many States and Territories, nothing is required but a theoretical examination—the written answers to ten questions—for which an applicant might cram with a quiz compend overnight, and might then be launched on the community with the State's license to attend women in childbirth, although he may never have seen a woman in labor and is grossly incompetent to deal with even a minor complication.

Besides consulting the last edition of the pamphlet on this subject,

No requirements except a theoretical examination	Class A and B schools of C on M.E.A.M.A., but no specific requirements as to cases on roster	Requires the standard of the Asso. Amer. Med. College
Illinois West Virginia New York Minnesota Massachusetts (not even a degree) New Hampshire Georgia North Carolina Montana Utah Oregon New Mexico (nothing but a medical degree from Class A and B schools) not even a theoretical examination. Arkansas District of Columbia Hawaii, Idaho, Indiana Kansas, Maine, Mississippi Nebraska, Alaska, Nevada North Dakota, Porto Rico, South Dakota Tennessee, Wyoming.	Alabama Vermont South Carolina Florida Wisconsin Colorado Kentucky	Arizona Maryland Oklahoma Philippine Islands Washington
Requires a specific number of cases but no specifications as to roster	A specific number of cases and a certain number of hours on the roster	
Ohio, 5 cases. Rhode Island, 10 cases and one year's internship in a hospital. Pennsylvania, 12 cases, 6 in undergraduate school, 6 in hospital year.	Virginia: 10 cases; 128 hours in third year, 64 hours in fourth. Delaware, 6 cases; 180 hours. . Connecticut, 6 cases; 195 hours. Louisiana, 6 cases; 180 hours. Missouri, 5 cases; 160 hours of which 60 are clinical. Texas, 6 cases, 120 hours of lectures. California, 165 hours on roster and 6 cases. Iowa, 3 cases; 160 hours. Michigan, 6 cases; 160 hours on roster.	
New Jersey has no specific requirements but medical school must be registered as first class by the Board of Licensure.		

published by the A. M. A., I have written to the secretaries of the Boards of Licensure of all the States and Territories of the Union and to the Secretaries of the Council on Medical Education of the A. M. A. and of the association of American Medical Colleges. The result of this inquiry is appended on the preceding page.

The Council on Medical Education "recommends" 180 hours on the roster for obstetrics exclusive of time of attendance on six labor cases. The association of American Medical Colleges requires witnessing twelve cases, and personally conducting three, before, during and after labor, under supervision.

If the general public could see what goes on in any one of the large obstetrical clinics of this country; women admitted with ruptured uterus; with their intestines hanging out of the vagina so that if they could walk, they might trip over them like a gored horse in a Spanish bull fight; exsanguinated from a neglected placenta previa or an overlooked ectopic pregnancy; infants torn limb from limb; their heads pulled off and left in the uterus; forceps forced on the lower uterine segment till their tips penetrate the vaginal vault; and so on, through a catalogue of horrors; if, I say, the public knew the facts, the boards of licensure throughout the country would be forced to do the duty for which they were appointed by the State.

There are some exceptions to the disgraceful negligence of many states as may be seen in the appended list of State requirements, but even the best of these requirements is inadequate, judged by international standards. Our very highest demands would not qualify a man to practise in the most civilized countries of the world.

Is there any good reason why our women should be afforded less protection than is considered necessary in other countries? But it is not our purpose, this evening, to criticise the rest of the United States, however much we may deplore the semibarbaric laws of many states in our common country. Our concern is with Pennsylvania. It is gratifying that in some respects we have enacted a more enlightened legislation on this subject than any other State. It is particularly a source of pride to the Philadelphia Obstetrical Society that we owe our advanced position in this matter to a board of licensure whose president is our ex-president, fellow-member and old friend, Dr. John M. Baldy. I, for one, have followed his intelligent, self-sacrificing and progressive efforts to raise the standard of medical education and practice in the State of Pennsylvania with the greatest interest and the warmest sympathy. Knowing as we

do from what has already been accomplished, that he and his board are determined to afford the citizens of Pennsylvania adequate protection from ill-trained physicians and incidentally to improve the teaching and practice of medicine in the State. I felt sure, when this meeting was organized, that he and any other member of the Board who cared to attend, would welcome an interchange of views with the teachers of obstetrics in the medical schools of the State; all of whom are present to-night.

If I were a member of a Board of Licensure, the duty of my position that would weigh heaviest on my mind would be the protection of the child-bearing woman from mutilation, disability and death, due to incompetent medical attendance. If I could without a catch in my throat, but I never can, I would quote the magnificent peroration of Oliver Wendell Holmes on what is due the woman about to become a mother. Besides it would be a banality to quote what we all remember so well. With the words of Holmes still ringing in our ears as though they had just been spoken and animated by the sentiment that inspired them let us see if it is not possible and practicable still further to improve our law regulating the amount of practical training in obstetrics necessary to qualify a physician to enter upon the practice of his profession.

In an investigation of the medical student's education in obstetrics in America and Europe, undertaken for the American Gynecological Society, followed by a personal inspection of the German, French and British schools, I was particularly impressed with what has been done recently in France as a model for our consideration. In that country, the governmental requirements for a physician's license to practise, until a few years ago, were about as archaic, provincial and inadequate as ours are to-day. Owing to the intelligent interest in the subject aroused by the efforts, I believe, of Professor Bar and some of his colleagues in Paris, a notable reform was effected. The present law requires four months daily attendance for three hours a day on a clinic; sixteen days residence in the hospital and a personal conduct of the delivery of at least twelve women. This regulation takes into account an important educational feature either ignored by our laws entirely, or in a few instances insufficiently provided for. I refer to the uninterrupted attendance on clinical demonstrations for a period of time; in France, four months. This is only a third of the time required by the German and Swiss schools, but it is enough in a large maternity to insure the demonstration of most of the complications and the pathological consequences of the process of generation. The mere attendance on five or six labors or on ten

as in Virginia and Rhode Island or even twelve as in Pennsylvania, insures nothing more than the training of a midwife. The chances are in favor of all this small number being perfectly normal, so that as far as the State knows, the physician might enter practice without ever seeing forceps applied, version performed, the evacuation of a uterus after abortion, not to mention such complications as eclampsia, obstructed labor, postpartum hemorrhage, placenta previa, premature separation of the placenta, ruptured uterus, or other injuries of the genital canal; and without having witnessed the pelvic and abdominal operations required for the complications and pathological consequences of childbirth, immediate and remote.

This is one of the criticisms I would make of our present State law, in which it is as defective as the law of any State and is inferior to some of them. Michigan, Virginia and Missouri, for example, expressly stipulate that a medical school must have given sixty hours of clinical instruction in obstetrics, an absurdly insufficient time, contrasted with the four months or, in our way of expressing it, the 360 hours in France, but better than nothing.

In this connection let me enter my protest against our custom of chopping the medical curriculum up into hours like that of a primary school, based on our antiquated system of the hourly lecture and to express the hope that a reform in this particular may be brought about by a wider knowledge of medical pedagogics. All clinical teachers will agree with me that a three-hour period is necessary for an adequate clinical demonstration: expressed in these terms the highest demands of any of our States is for a three weeks' course in clinical obstetrics! Exposed in all its nakedness by this method of expression, is it strange that our medical degrees and licenses to practise are regarded with contempt abroad?

Another thing I would criticise in our State law is the requirement that the applicant for a medical license must have half his practical obstetrical training in his hospital year after leaving the medical school. What educational advantage can this arrangement possibly secure? Its disadvantages are obvious. According to this law, the majority of our medical graduates will get half of their practical training in a hospital with a few beds set aside for child-bearing women and in a service conducted by someone of necessarily limited experience. I have recently come across two instances of what might be expected from this plan. I heard the chief of such a service dogmatically describe a grotesquely incorrect treatment of one of the rarer accidents of childbirth based on an experience with a single case and in another instance was told of a

fatal hemorrhage in one of our smaller hospitals that could easily have been prevented by proper management. Take the average of the small maternities throughout the State with a service each of about 100 cases a year. It takes more than 300 normal cases to furnish one of postpartum hemorrhage, eclampsia or adherent placenta; 1200, one of placenta previa; 2000, one of premature separation; 4000, one of ruptured uterus, so that three years might be required in such a hospital to demonstrate the treatment of postpartum hemorrhage, adherent placenta or eclampsia, twelve years that of placenta previa, twenty years that of premature separation and forty years to give a single experience with ruptured uterus.

The medical and surgical services of these small hospitals are quite different; every case admitted is a disease entity, conveying its lesson and conferring experience in diagnosis and treatment.

Would not the result that it is the duty of the State to obtain, be better reached, as in the rest of the civilized world, by fostering the accumulation of the largest possible amount of clinical material in the maternities of our medical schools and by insisting upon an amount of time devoted to instruction that would insure a practical knowledge of the best methods of dealing with all possible complications and sequels of labor. Our plan of diffusing clinical material in dribblets all over the State and then compelling our medical students to obtain a part of their education in institutions that cannot possibly give it in an adequate manner, would be condemned, I think, by any expert in medical pedagogics.

No one should indulge in destructive criticism without having something constructive to offer in place of what he condemns.

Of the medical schools of the State, two at least are prepared to give an education in practical obstetrics including gyneology that would bear criticism by international standards, the University of Pennsylvania and the University of Pittsburgh. Take the former of which I can speak advisedly. The course consists of sixty-four didactic lectures, thirty-two hours of clinical conference, sixty hours of clinical and operative demonstrations with individual instruction; ten days residence in the hospital; ten days' residence in the out-patient department,* with the privilege of two to three weeks' voluntary residence each in hospital and out-patient department; attendance on an average of twenty cases besides individual drill in mannikin work, cystoscopy, palpation, pelvimetry, history taking, etc. No student can leave the school without seeing numerous examples of complications and their treatment.

* With an average of ten cases personally attended.

Pittsburgh, I know, is equipped to offer its students at least as much. Columbia, Washington University, Michigan and Harvard are in the same class.

Now would not the State Board of Licensure more certainly obtain the result which I am sure they are conscientiously desirous of obtaining—namely, providing for the child-bearing women of the State, physicians to whom such patients can be safely entrusted—if they demanded of all schools an adequate equipment and time for teaching this subject? It might be objected that some of the schools of the state cannot yet meet the requirements that would be insisted upon by the older civilized countries of the world, and that their graduates would be unjustly barred from practice in this, their own State. If so, would not the energy of the Board of Licensure be better directed by recommending State aid to these institutions, if they need it, to bring their facilities up to the required standard, rather than to force upon every little hospital in the State, a maternity department whether it is needed or not and to insist that these small institutions should give the student a part of his education which he could get much better in his medical school.

By our present law, a student of Columbia's medical department who sees fifty deliveries and witnesses most if not all, the complications that he may have to contend with later, but who has not supplemented his excellent education by personally attending six cases of labor in some small maternity with inferior experience, technic and equipment, is, as I understand it, barred from practice in this State. The same is true of a Harvard student who attends on the average forty cases under expert superintendence. A medical student in his summer holiday might take a three months' course in the Lying-In Hospital of New York City with the largest obstetrical service in the western hemisphere and then would be compelled by our law to supplement this experience with a post-graduate training that would often be worthless. And in our own State, a graduate of the Universities of Pennsylvania and Pittsburgh with a practical training that cannot be equalled elsewhere in the State, must supplement it with a small amount of additional practical training under inferior tutelage.

Another factor deserves consideration. Our whole system of medical education and state licensure in America is open to criticism in its extraordinary lack of uniformity; no other country presents such a spectacle.

Massachusetts, of all places, requires nothing, not even a medical degree; New Mexico requires only a medical degree, nothing else;

while Virginia and Rhode Island have requirements that approach those of the most intelligently governed countries. We, in Pennsylvania, are adding to this confusion worst confounded by adopting a system that I may safely predict will be imitated by no other State.

Would it not be better to conform in principle to the system already adopted by Rhode Island and Virginia, whose example will probably be followed by other States, and would it not be practicable to surpass the requirements of these States in practical training by avoiding Virginia's error in overbalancing clinical instruction by a superfluity of theoretical teaching. We would then set a model for the rest of the States to follow; we would make a uniformity of our State laws gradually attainable; we would really guarantee to the citizens of the State, physicians of the greatest efficiency; we would not admit some who were really not qualified and exclude others who were eminently well fitted to practice.

These questions have given me, whether rightly or wrongly, great concern as one who has devoted a lifetime and an earnest, if humble effort to improve that branch of medical education in which we have been admittedly most deficient.

They are respectfully submitted for the consideration of my colleagues, the teachers of obstetrics in Pennsylvania and the State Board of Licensure.

1821 SPRUCE ST.

TREATMENT OF ECLAMPSIA.*

BY

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Philadelphia, Pa.

WE wish to present for your consideration a paper upon the treatment of eclampsia, with reference especially to a description and a comparison of the treatments now in vogue in the larger clinics of this country. For only in this way may it be possible, as I shall point out to you, to come to some definite idea as to the best treatment for this obstetrical calamity.

At the present time the treatment of eclampsia may be classified as either radical operative treatment (and by that we mean abdominal Cesarean section, vaginal Cesarean section and "accouchement force") or expectant symptomatic treatment.

* Read before the Obstetrical Society of Philadelphia, March 2, 1916.

Each plan has its earnest advocates. This is natural and to be expected as it is in every problem in medicine, about which there may be a difference in opinion.

And yet owing to the fact that we are accustomed to look to surgery for quick results in so many pathological conditions, so the operative treatment of eclampsia has become unduly popular in the last five years, to the exclusion of older methods which have been tried and not found wanting.

We believe that this is a mistake. We shall show you by the analysis of eighty-three cases which have been treated during the last five years in the University Maternity, that our results have been better and our mortality lower than by any radical operative treatment that we know of.

The treatment that is prescribed at the University Maternity is as follows:

Lavage of the stomach; 2 ounces of castor oil given through the stomach tube; twenty to thirty minutes sweat in the sweat cabinet; hypodermic of morphia, gr. $\frac{1}{2}$ is given if the convulsions are violent or frequent; hypodermoclysis after the first sweat, followed by proctoclysis midway between subsequent sweats; venesection if systolic blood pressure is over 180 and more particularly, if the diastolic pressure is high; an initial dose of veratrum viride (10 minims) followed by nitroglycerine gr. $\frac{1}{100}$ at four-hour intervals. Puncture of membranes if pregnant or in labor and abstention from any operative interference to hasten delivery, which we find is spontaneously terminated in from eight to ten hours from the institution of treatment.

It is not our purpose to draw your attention to anything except the treatment of eclampsia, but it is necessary to elaborate somewhat on the type and severity of our cases, so that you may infer the results of the treatment.

Of the eighty-three cases of severe toxemia of pregnancy treated in the Maternity from 1910 to 1916, forty-eight had convulsions before delivery. Of these we have a definite record of seventeen having had convulsions after delivery also, *but* as the details of some of the records were rather poorly kept during this period, it is reasonable to presume that there were more than seventeen cases in which the convulsions continued *after delivery* because the eliminative treatment was continued for quite some time.

Twenty-four had convulsions after delivery only. Of these, four died, a mortality of 16.66 per cent.

Ten cases were admitted in various stages of their pregnancy with

severe toxemia and all the symptoms of impending eclamptic convulsions. These cases were relieved by eliminative treatment and either discharged before delivery or delivered without the onset of convulsions.

Two cases were delivered by vaginal section—with one death immediately after delivery.

Six cases died within a few hours after admission and after delivery. Of these, four cases never revived from the state of coma in which they were admitted.

One case died in a convulsion after being delivered.

Another case delivered before admission, died suddenly after responding well to eliminative treatment. Postmortem showed cerebral embolism.

Four cases had previous attacks of eclampsia. One case having had convulsions in two former pregnancies.

Craniotomy was performed in one case.

One case died in the hospital one month after admission, of general toxemia and nephritis.

The total mortality of these eighty-three cases, whether the deaths occurred only fifteen minutes or one month after admission, was fourteen or 16.8 per cent. If we exclude those cases dying within twenty-four hours, but *including* the case dying a month afterward, our mortality was five or six per cent.

It is hardly reasonable to include cases dying within twenty-four hours in any statistics upon eclampsia. Even those favoring Cesarean section in all cases, will admit that the ratio of their success is in inverse proportion to the number of convulsions, and therefore it is reasonable to assume that cases admitted so late in the disease as to die within twenty-four hours, would be so saturated with toxemia, that any operative procedure would be unavailable. Therefore, I repeat, if we exclude those cases dying within twenty-four hours, most of them within a few hours, our mortality is 6 per cent.

It may be well to draw your attention at this point, to a very important fact, and that is, within the last five years there has been a tendency on the part of those doing Cesarean section for eclampsia, *not* to include cases of postpartum eclampsia, in their statistics. As you have seen, those cases developing eclampsia following delivery have been a considerable proportion of our total number, namely, twenty-four out of eighty-three, and as you well know, these postpartum case shave a higher mortality than those developing convulsions before delivery. How, then, shall these cases be treated?

Through the courtesy of Dr. Hirst, we have received personal letters from some of the larger obstetrical services of the country, as follows:

Dr. Markoe of the Lying-In Charity, of New York, tells us that within the last five years they have had there 216 eclamptic cases with thirty-eight deaths, a mortality of 17.6 per cent.

Dr. Markoe believes in Cesarean section in all primipara with rigid cervix. In multipara, with previously lacerated pelvic floors, he says that it doesn't make much difference what kind of delivery is done.

He believes that a pack in the cervix is a great irritation and does not believe in manual dilatation.

He does not mention any routine treatment except catharsis and irrigation of the bowel, and therefore we do not know what eliminative treatment he advises or practices. It is his belief that, since we do not know the cause of toxemia, each case should be treated individually.

Dr. Cragin of the Sloan Maternity, New York, reports eighty-three cases of eclampsia in 10,116 confinements, including in his classification of eclampsia only those cases of toxemia, which have had convulsions. Of this number there were thirteen deaths, a mortality of 15 per cent. His routine treatment is as follows:

Colon irrigations; chloral by rectum; nitroglycerine hypodermatically; an elastic bag has been introduced into the cervix in preparation for delivery, very soon after admission. The treatment by colon irrigation, etc., mentioned above, has been continued while the bag has been softening and dilating. If the blood pressure has continued high and the pulse rapid, *veratrum viride* has been employed rather than venesection.

Dr. Ernest B. Young, of the Boston City Hospital, describes in detail, 143 cases of threatened or actual eclampsia, with sixty deaths, a mortality of 42 per cent. Two of these, however, died of sepsis. Dr. Young describes the medicinal treatment in the Boston City Hospital as follows:

Free catharsis; gastric lavage; control of convulsions by sedatives (does not mention what), and ether; enteroclysis and hypodermoclysis and hot packs in some cases. He doubts the efficiency of sweating. He rather favors manual dilatation which was employed in forty-six cases. Three cases were delivered by vaginal Cesarean section and they all died.

Dr. Newell, of Boston, writes to us that there have been seventy

cases of eclampsia with convulsions admitted to the Boston Lying-In Hospital during the last five years, of whom eighteen died, a mortality of $25\frac{1}{2}$ per cent. These cases were treated by different members of Dr. Newell's staff in their own way and no routine method of treatment was carried out. Therefore, as Dr. Newell himself points out to us, the results obtained in the Boston Lying-In Hospital are of little value statistically.

Dr. Newell describes his own method of treatment as follows:

"The question of immediate operation or preliminary treatment and the method of delivery, in my opinion, depends on the condition of the patient at the time of admission to the Hospital and her history. The patients who are in active labor are delivered as soon as the condition of the soft parts makes it possible, delivery being hurried or not according to the recurrence of the convulsion seizures. The patients who are not in labor ordinarily receive some preliminary treatment directed toward the emptying of the intestinal tract and to lessening the patient's sensibility to the irritating poison by the use of morphia followed by induction, usually by means of a bag, unless the cervix is very soft, or vaginal Cesarean section in case it is unusually rigid, as soon as it responds to the preliminary treatment, or if the condition gets worse in spite of treatment."

Dr. Reuben Peterson reported in the *AMERICAN JOURNAL OF OBSTETRICS* for June, 1914, a review of a series of 283 cases of eclampsia delivered by abdominal Cesarean section between 1908 and 1913, by many different operators all over the world.

In this series there were seventy-three deaths, or a mortality of 25.79 per cent. Previous to 1908, he reports 198 cases, with ninety-five deaths, or a mortality of 47.97 per cent.

Of the important clinics abroad, Zweifel reports a series of eighty-four cases between 1910 and 1915, treated by profuse venesection, (at least 500 c.c. being taken) in association with Stroganoff's treatment with a mortality of 5.9 per cent.

Stroganoff reports 839 cases of eclampsia treated by his method in different clinics (morphia, chloral and chloroform), with a mortality of 8.9 per cent.

It seems to us that from this brief résumé of the results of the different treatments of eclampsia, that the time has not yet come to discard entirely those efforts which we have efficaciously directed for years toward the elimination of the unknown toxemia.

Its etiology is as obscure to us now as it was ten or fifteen years ago. We may only hope that someone will eventually find out by

chemical, physiological or pathological investigation, the cause of this dreadful complication of pregnancy.

When this time comes, we shall certainly be able to suggest a treatment that will be more specific in character than any we now practise and therefore I hope more successful.

2007 CHESTNUT STREET.

THE TEACHING OF GYNECOLOGY TO THE ADVANCED PUPIL.*

BY

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New York.

THE pedagogics of gynecology in general and of postgraduate gynecology in particular, present intrinsic obstacles to teacher and student, that are not encountered in other specialized departments of medicine and surgery.

Its diagnostic fundamentals demand, as an essential prerequisite, the cultivation of a keen tactile perceptivity, which can be acquired only among ample clinical facilities.

Such clinical facilities are circumscribed by obvious prohibitive restrictions, which limit the utility of the average gynecological patient for objective class demonstration, and create a relative paucity in opportunities for specialistic cultivation.

He, to whom these initiatory obstacles have proven no hindrance, will behold gynecology in the dawn of a new era.

The mechanistic empiricism that dominates the votaries of the established practice, is slowly but surely merging into the realm of the obsolete.

Surgical virtuosity alone no longer constitutes a gynecologist: Healed incisions and operative correction of purely objective deviations from hypothetical normals do not prove the cure, while the use of symptomatic nosology does not establish a diagnosis.

We were taught to see a passive retention wedge in the "perineal body"—where we now recognize an active myodynamic deflector of intraabdominal pressure in the levator ani muscles.

The time is passing when "endometritis" encompassed the beginning and end of all uterine pathology; when "reflex neurosis" presented the shibboleth of its symptomatology and "curettage" the slogan of its therapy.

* Read before a meeting of the Section on Obstetrics and Gynecology of the N. Y. Academy of Medicine, February 24, 1916.

Henricius in 1889 unwittingly laid the foundation of uterine physiology, when he graphically demonstrated that the normal non-gravid uterus is a rhythmically contracting organ; Leopold in 1874 blazed the path to its rational pathology when he revealed the myometrial lymph channels; Kundrat in 1873 exposed endometritis as a normal manifestation in pathological guise, thus transposing the pathogenesis of its cardinal symptom, namely, hemorrhage, from an anatomical to a biochemical basis.

This biochemical genesis projects its whole dominating hierarchy of the internal secretions upon the gynecological horizon, where in the haze of the "reflex neuroses," we begin to discern the lineaments of insidious sepsis and toxicosis.

Current terminology, accurate and inaccurate, dominates our concept and concept determines practice, so the term "metropathic hemorrhage," for instance, links fact and fancy, the hemorrhage is the fact, the "metropathic"—a fancy, nevertheless this term is conventionally synonymous with hysterectomy, notwithstanding that the purely functional nature of the hemorrhage as a result of inefficient thyroid or pituitary metabolism has been demonstrated in many cases successfully controlled by appropriate organo-therapy.

The same line of research will divert many a case of sterility from utterly futile cervicoplastic operations, while on the other hand, the controversy as to the clinical significance and choice of corrective measures in uterine displacements will frequently find its solution in the recognition of those skeletal abnormalities, congenital or acquired, in which misdirected intraabdominal pressure induces *necessary compensatory* deviations from normal lines of visceral topography.

These few phases from among the many will serve to indicate the broadening scope and wider range of advanced gynecology.

The student must be taught to see beyond his finger tips: an organism, not an organ is the object of his study. He must learn to calculate in terms of gonad and endocrine denominators, to balance and correlate—orthostatic, dynamic and biologic factors in his clinical definitions.

He must be enabled to differentiate the gynecological manifestations of systemic disorders from the systemic disturbances of gynecopathic origin.

This wide diversity in essential contributory and complemental elements has not and cannot be crystallized to the concrete homogeneity of a text-book stage, so that an adequate proficiency in this

technical complex must be sought among ample polyclinical facilities under judicious guidance.

Individually, post-graduate students are ardent, earnest men who seek knowledge at personal sacrifice; collectively, however, they present a mental and technical heterodoxy, that ranges from specialistic endowments down to an absolute lack in first principles—and in the present status of post-graduate instruction, the teacher must adopt a course that ranges from the needs of those who cannot locate a fundus uteri, to those who seek the last word on the chemotaxis of ovular nidation.

In the New York Polyclinic, each of six gynecological divisions, conducts two clinics weekly, one operative and one ambulatory.

The morning sessions are devoted to details of surgical technic and the incidental study of operative findings in their anatomic, pathologic, symptomatic and diagnostic bearings.

It is the ambulatory clinic, however, with its wider range, that affords opportunities for the discussion and elucidation of advanced gynecological problems.

In the ambulatory division of my clinic, I have adopted a course which meets as nearly as possible the requirements of those seeking only a practical working knowledge as well as those interested in the more academic phases of the subject.

My class is divided into sections of two members, each section having its case assigned for examination under my supervision and that of my staff.

Sounds and specula are discarded and the previously established diagnoses and histories are withheld for the time.

The students are supplied with the blank forms, here reproduced, on which their dictation of objective abnormalities are noted in strict topographic sequence.

During the manual examination of the patient, any deficiency in method or tactile perception on the student's part is corrected, while his verbal delineation engenders differential precision.

Based upon these objective findings, the functional disturbances are deduced and their incidental symptomatology postulated.

The whole class participates in the diagnostic equations thus propounded, this elicits their individual conceptions and misconceptions, and affords the teacher opportunity to correct the latter and amplify the former by elucidating those higher phases of the subject embodied in the term "Advanced Gynecology."

The final conclusions are now compared with the history of the

DEDUCTIVE GYNECOLOGICAL DIAGNOSIS				No.
				Name
Topographic Sequence	Objective Features	Functions Involved	Symptoms Deduced	Diagnosis
VULVA				
INTROITUS				
VAGINAL-CANAL				
CERVIX-UTERI {				
Os-outlines				
Direction				
FORM				
Consistence				
FUNDUS-UTERI {				
Direction				
Size				
FORM				
Consistence				
MOBILITY				
ADNEXA {				
Situation				
FORM				
Consistence				
MOBILITY				

case and the diagnosis corroborated by the approximate coincidence between the objective deductions and the subjective data.

Advanced gynecology was an art and is a science.

The teacher can demonstrate its practice and elucidate its theories, but he cannot impart aptitude, and when all is said and done, he becomes convinced, that advanced gynecologists are born and not made.

51 WEST SEVENTY-FOURTH STREET.

TRANSPERITONEAL CELIOHYSTEROTOMY.

BY

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IN offering this subject for your consideration, I do so with much embarrassment, for here in Brooklyn our obstetricians have attained such perfection with the classical operation by the general adoption of a simple standard technic, that we approach an abdominal delivery with little fear. Yet I am convinced after reviewing our morbidity records at the Long Island College Hospital, that there is room for improvement. Especially is this so in the "suspect" class, where the morbidity has reached nearly 50 per cent. American obstetricians have been slow to accept extraperitoneal section. This is perhaps due to the more difficult technic which lengthens the operation, and again the procedure is less theatric than delivery by Sanger's classical method.

Extraperitoneal celiohysterotomy has, however, many definite advantages over the classical section: First, the general peritoneal cavity is not contaminated by any leakage of liquor amnii, as the route of delivery precludes soiling owing to the suture of the peritoneum of the uterus to the parietal layer. Women who are long in labor with ruptured membranes have numberless bacteria in their uteri, many of which are pathogenic; the classical celiohysterotomy exposes the peritoneum to infection from this source.

Second, subsequent deliveries may be done through the same scar without entering the general peritoneal cavity, or the delivery may be spontaneous without danger of uterine rupture, as the scar is in the dilating segment, and not in the contractile part of the uterus.

Third, omental and intestinal adhesions are less frequent.

Fourth, the shock and postoperative gas complications are decidedly minimized.

Fifth, should infection occur, the lesions found are parametric or are extraperitoneal exudates which are competent to protect the organ against the organism.

Extraperitoneal Cesarean section is not a new procedure, but rather a revival of an old one, as it was first suggested by Joerg, as

early as 1809, and employed by Ritgen in 1821. Physick of Philadelphia recommended it to Dewees in 1824. From this time until 1870, when T. Gaillard Thomas revived the extraperitoneal method of delivery, no mention is made of it. Badelocque had suggested in 1823 the term gastroelytrotomy, which was adopted by Thomas for his modified technic. In this procedure, an incision was made above and parallel to Poupart's ligament, to the subperitoneal tissues, and the peritoneum separated back from the abdominal wall by blunt dissection, while the bladder was pushed to one side to expose the cervix and vagina. The lower uterine segment thus exposed was then opened and the child delivered by a circuitous route through the incision in the flank. Infection was so common as to finally cause the abandonment of the extraperitoneal route, and again the method fell into disuse until 1906 when Frank, of Cologne, reintroduced the extraperitoneal delivery, suggesting an improved technic which has been modified by Döderlein, Sellheim and others and is extensively employed in Germany. In America extraperitoneal section by the German technic has met with little favor. Hirst and the writer prefer to employ the transperitoneal method of Veit and Fromme, which when properly executed has all of the advantages without the dangers of the older method. We have elected this procedure in the cases which would formerly have come in the Porro class and our results have been so satisfactory that we are now using it in all cases requiring abdominal delivery.

It must be admitted that the classical section leaves much to be desired, *i.e.*, it is not safe where infection is present. E. P. Davis, Peterson, and Williams insist that the section be followed by extirpation when the case has been handled. Second, postoperative intestinal complications are frequent. This is particularly evident if the intestines are handled or are eventrated during operation. Third, peritoneal adhesions are frequent between the uterine wound and the parietal peritoneum, fixing the uterus high in the abdomen. Fourth, the uterine scar being in the contractile portion of the uterus, may rupture in a subsequent labor. Fifth, there is still a definite mortality of from 1 to 5 per cent., even in the best clinics.

In November, 1914, stimulated by Hirst's success, we began the employment of the extraperitoneal route, in neglected cases, instead of doing the Porro operation which is so emphatically endorsed by E. P. Davis and Williams. Numberless modifications of the original technic have been suggested, but they all fall into two general classes: the true extraperitoneal, as illustrated by the technic of Döderlein and Latzko, and the transperitoneal section as advocated

by Veit, Fromme, and Hirst. It is the latter which we have adopted, and which I will attempt to describe.

The method is simple. With the patient in a moderate Trendelenburg posture, an incision 6 inches long is made to the right of the median line, below the umbilicus. When the peritoneum is opened the uterus is pushed into the wound, and the bladder reflection is located and picked up between forceps and nicked, and then with Mayo scissors run up and down in the subperitoneal tissues of the lower segment, the bladder and visceral peritoneum are easily separated. Forceps are then placed on the peritoneal reflection of the uterus and that of the abdominal wall, and the visceral and parietal layers united by a series of sutures. We use an interrupted figure of eight suture of catgut, leaving the ends long. A forceps is placed on each suture until tied. When these two layers of peritoneum are united, the lower uterine segment is extraperitoneal and may be entered without possible leakage into the general peritoneal sac. In our first two or three cases we found that during the delivery the sutures at the upper angle tore away. To correct this we have in our later cases sutured the uterus to the peritoneum and fascia and thus fixed the uterus at its upper angle. The baby is delivered in the usual fashion, the placenta extracted manually and the wound in the uterine muscle closed with interrupted sutures of chromic catgut. In infected cases it is our custom to place in the uterus an iodine soaked gauze pack, which is removed via the cervix and vagina at the completion of the operation. After the uterine wound is closed, the two layers of peritoneum are united with a continuous suture. Thus is completed an extraperitoneal delivery and an extraperitoneal closure.

Our experience is limited to eight cases, with no mortality. The recovery is very prompt and the freedom from abdominal distress has been impressive to those of us who have had experience in abdominal operations.

Cellulitis and thrombophlebitis are possible complications which may result from a too extensive separation of the visceral peritoneum from the lower uterine segment. These accidents have not occurred in our cases, but one cannot but appreciate that they are possible sources of trouble as the operation is done through the thinned and dilated portion of the uterus.

In extraperitoneal section we believe we have a procedure which will replace the classical operation in all cases in which a test of labor has been given. Its more general employment should reduce the mortality in all classes, and give both mother and child a better chance.

EXERCISE ON ALL FOURS AS A MEANS OF PREVENTING SUBINVOLUTION AND RETROVERSION.*

BY

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IN reviewing the literature one is amazed at the scarcity of articles dealing with the latter half of the puerperium.

The proper time for the puerperal patient to remain in bed, the correct posture for her while in bed, the value of bed exercises, the relation of lacerations and subinvolution to retrodisplacements and many subjects of a similar nature, are repeatedly discussed. Our text-books are agreed as to the proper hygiene of the puerperium. In fact, after consulting the current literature and our text-books on obstetrics, one would never surmise from the lack of thought concerning the puerperium that gynecology draws a large percentage of its cases from obstetrics.

The various measures suggested by the numerous writers on the hygiene of the puerperium have from time to time been employed in the maternity wards of the Long Island College Hospital. Patients have been allowed out of bed early, others have remained in bed as long as eleven and twelve days. We have tried the Fowler position. Mothers have sat up as early as the fourth day. They have taken the dorsal, the lateral, the lateral prone and the prone position for a considerable time during their stay in bed. Bed exercises have been employed. The knee-chest position has been resorted to as soon as the patient's condition would permit. Lacerations have been carefully repaired.

In spite of all of our efforts, our postpartum clinic continually showed us the inefficiency of our methods. Many cases returned with subinvoltuted uteri and from 20 per cent. to 30 per cent. had retroversions of varying degrees.

For some time these were considered the inevitable results of childbirth and were accordingly treated by the usual methods. Following the use of the median perineotomy considerable difficulty was encountered in treating these cases. The pelvic outlet so closely resembled that of a nulliparous woman that a suitable pessary could

* Read before the Brooklyn Gynecological Society, February 4, 1916.

be introduced only with the greatest difficulty. As many of our postpartum cases which returned from the hospital were primiparæ in a large per cent. of whom perineotomy had been done, we were compelled to seek some better means of preventing these troublesome retroversions.

Believing that walking on all fours might have a beneficial effect, this was tried. On the ninth day after labor each patient was required to walk five or six yards on her hands and feet with the knees held as stiffly as possible. On the tenth day the distance was doubled and the exercise was performed in the morning and afternoon. The walk was increased proportionally each day until discharge, when the patient was advised to continue until she returned to the postpartum clinic two or three weeks later. As the clothing offers some little interference, they were asked to follow these instructions in the morning before dressing and at night after undressing.

The number of cases examined since beginning this procedure are not sufficient to warrant final conclusions. However, the result so far observed may justify their being reported. During this time I have examined 102 women in the postpartum clinic, sixty of whom were confined in their homes by our out-patient service and the remaining forty-two were hospital cases.

All of the patients confined at home were multiparæ. Many had several small children and it was impossible to keep them in bed more than three or four days. Of the sixty, twenty-seven or 45 per cent. were found to have retroversions. Subinvolution was not infrequent and in some the vaginal discharge contained blood. Walking on all fours was not advised in any of these cases.

Of the forty-two patients who came from the hospital nineteen were primiparæ and twenty-three were multiparæ. Twenty-five had good pelvic floors while nineteen showed relaxed outlets. At the time of discharge five cases showed poor involution and three retroversion. All of these forty-two women had exercised in the above manner for from one to three days during their stay in the maternity ward. Ten or 24 per cent. returned with retroversions in from one and one-half to two months after confinement. Five of the ten, however, failed to continue the treatment at home and their result does not merit consideration. Excluding these, only five or 13.5 per cent. of the remaining thirty-seven who continued the exercise in the prescribed manner showed retroversion on their return.

The ten retroversions are of interest in that seven occurred in

primiparæ in all of whom the pelvic floor offered excellent support, while only three were observed in multiparæ with relaxed vaginal outlets.

The most noticeable change was observed in the involution. Before instituting this treatment patients on their return to the postpartum clinic, not infrequently showed marked subinvolution and occasionally complained of the bleeding which accompanied this condition. Not one of the cases in this series was found to have a subinvoluted uterus and in most instances the uterus was considerably smaller than was to be expected at the period of the puerperium at which the patient was examined.

How this mode of exercise produces these results I am unable to state. Examination during the latter part of the second week of the puerperium shows that while the patient is walking on all fours, the fundus falls forward and out of the pelvis resting on the abdominal wall slightly above the symphysis pubis, the cervix is carried posteriorly and moves slightly with each step. There is a distinct lateral rocking of the pelvis. Possibly this movement of the uterus may stimulate contractions.

If it were possible to draw conclusions from a series of cases as small as the one herein reported it would appear that the early getting out of bed after confinement increases the tendency toward retroversion; that the condition of the perineum has little bearing on the question; that most of these poor results occur after the second week postpartum at a time when patients are usually neglected; and finally walking on all fours because of its simplicity offers a means of preventing retroversion and subinvolution in those patients who are not faithful in carrying out the more complicated procedures.

DYSMENORRHEA.*

BY

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DYSMENORRHEA can be said to be a hyphenated subject, as it may be considered as both a symptom and a condition.

I do not know any symptom which is more trying, or in which we should be so guarded in our prognosis, as that of painful menstruation.

* From the Clinic of the Joseph Price Hospital.

The condition requires the most careful investigation from a diagnostic standpoint, and is surgically most abused.

The subject recalls to me so many errors of commission from indifferent general surgical advice by those who have not given it proper thought, that I am justified in saying there is still in existence the specialty of gynecology.

To most operators, dysmenorrhea means in each and every case, dilatation of the cervix irrespective of pelvic pathology or the true character of the dysmenorrhea.

The etiology of dysmenorrhea in many instances is in doubt. I know of no condition which may be so diversified in its symptomatology, as dysmenorrhea. In one patient may be found all the mechanical conditions which would lead to an obstructive dysmenorrhea, yet the patient have a normal menstruation; the reversed condition of affairs is equally true. In other words, dysmenorrhea is a condition or symptom in which the local condition is much influenced or dominated by the peculiar type of patient. The gynecologist does or should know this and his advice be regulated by the same. The high-strung or nervous type of woman will have a dysmenorrhea from a condition of the pelvic organs which would give a normal menstrual flow in one of less tense nervous make-up.

The same may be said of the strumous type who often has a persistent dysmenorrhea. I have always been opposed to the standard classification of many subjects in surgery. It makes the minds of young operators too mechanical in their views.

In my consideration of the subject, I have in mind two forms of dysmenorrhea only, namely, obstructive and spasmodic, with the possible addition of membranous.

One may indefinitely extend his classification by adding to the two forms, obstructive and spasmodic, any number of compound terms such as ovarian, congestive, etc. Such classification only describes that particular local condition which may aggravate one of the types of obstructive or spasmodic dysmenorrhea. From a therapeutic and diagnostic standpoint, I feel it is well to keep these complications of the real condition in mind, as they influence one's advice as to treatment.

OBSTRUCTIVE DYSMENORRHEA.

For a number of years I have felt that many cases classified as obstructive dysmenorrhea, were not so in reality, that there were few instances in which one could demonstrate any real obstruction to the cervical canal, and that most of the cases classified as obstructive dysmenorrhea, were in reality spasmodic.

I had arrived at this conclusion through my own error, which became apparent when I attempted to dilate the cervix of a patient in whom I had expected to find a stenosed canal, the operation revealing a patulous one. It was made even more apparent to me during operations on the infantile uterus in which I had expected to find a stenosed cervical canal in the superlative degree, but uniformly found the internal os of the infantile uterus even more open than the external one, and in reality more patulous than that of the normal uterus.

I have never felt that malpositions of the uterus were a frequent source of dysmenorrhea, other than they predisposed whatever variety of dysmenorrhea the patient may have had, to exaggerated symptoms incident to possible congested conditions of the pelvic viscera. I do not feel that bending of the cervical or uterine canal incident to a malposition is of sufficiently acute angle to cause true obstruction. The thick walls of the uterine body are such as to prevent obstruction from flexion. We have all seen the most exaggerated positions of retro- or ante flexion of the uterus, without symptoms of any kind; therefore, I am inclined to think dysmenorrhea due to obstruction, is not in a sense anatomical, but either surgical or pathological. For these reasons, the only two conditions I recognize as obstructive dysmenorrhea are, one, due to either amputation of the cervix or faulty repair of the same, and second, obstruction incident to malignancy of cervix and uterus and possibly other tumor formation or inflammatory condition. It has been necessary for me to do vaginal hysterectomy, because of obstruction dysmenorrhea, on a good number of patients following amputation of the cervix. Quite a number of patients have consulted me on account of painful menstruation due to malignancy of the cervix which had caused a mechanical stenosis. We have all seen cases of complete stenosis of the cervical canal due to malignancy with a resulting retention of blood, pus or uterine discharges; so I dismiss the subject of the etiology of obstructive dysmenorrhea with the thought, that practically all cases are either surgical or pathological in the sense of tumor formation.

SPASMODIC DYSMENORRHEA.

A very large per cent. of cases with dysmenorrhea are of the spasmodic variety. The true etiology and classification of dysmenorrhea have been obscured because of the surgical treatment by dilatation of practically all cases who consult us. Therefore, we have assumed, if dilatation of the cervical canal relieves the condition, it must have

been one of obstructive dysmenorrhea. I do not feel that this is so, as I have already pointed out in my discussion of obstructive dysmenorrhea. It is true that dilatation will relieve a large per cent. of cases of spasmodic dysmenorrhea, but it is not due to dilatation of the cervical canal in the sense of producing a more patulous canal for exit of uterine flow, but to relief of muscular spasm. You will find a large per cent. of cases classified as spasmodic dysmenorrhea reveal at time of operation practically no degree of stenosis; the dilator enters and is withdrawn from the cervical canal with ease. You will not relieve this patient by dilatation, the chance is the patient is suffering from pelvic visceral trouble which is exaggerated at the menstrual period; therefore, diagnosed as a dysmenorrhea.

In most cases which are truly of the type of spasmodic dysmenorrhea, when one attempts to remove the dilator from the cervix, the operator notices there is a perceptible degree of resistance to the withdrawal of the dilator. The cervix squeezes the instrument.

We obtain the best results from dilatation in cases which are typical examples of spasmodic dysmenorrhea. I do not think we have any knowledge of the true etiology of this peculiar spasmodic condition of the lower uterine or cervical canal. There have been a number of theories advanced regarding the cause of spasmodic dysmenorrhea, none of which are clear or incontestable. That form of dysmenorrhea, which seems to resist with extreme stubbornness all kinds of treatment, is found in patients who have an infantile uterus, which is so often accompanied by scanty menstrual flow. I have never known just where to place this type of case. It is not obstructive nor is it of spasmodic nature. As I have said, you will find in dilating such a case, that the internal os is even more open than in the normal sized uterus. This has been an observation I have often made and have not as yet seen it referred to in literature. The condition is truly not obstructive and you will also find that the cervix yields easily to dilatation with no resistance to entrance or withdrawal of the instrument, so it is not of the spasmodic variety. Does the pain come from lack of hemorrhagic area on account of the infantile or undersized uterus? You cannot say that the patient is anemic in type, as I have seen the most magnificent specimens of women with an infantile uterus, who have had the most extreme type of this variety of dysmenorrhea. It is in the dysmenorrhea of the infantile uterus that we obtain the best results from insertion of the stem pessary, and permitting the same to remain for weeks or months, with the idea that the pessary as a foreign body by irritating the uterus may produce a true hyperplasia and therefore increased size

of the uterus. Although I have resorted to this procedure a number of times with good results, I must say I always have the greatest apprehension of uterine infection. Even though the insertion of the stem pessary of modern pattern is done with the greatest aseptic precaution, I cannot but feel it is a possible source of infection. The insertion of any foreign body into the uterus, packing or draining the same, has never appealed to me. We must remember the vaginal canal is not sterile, so that any form of drainage, pessary or any other foreign substance inserted into the uterus is accompanied by the possibility of infection. Cases of infection have been reported from the stem pessary inserted for dysmenorrhea. Membranous dysmenorrhea is given as a distinct type, but as I can imagine its being a complication of either obstructive or spasmodic dysmenorrhea I have not made a distinct classification of it. The finding of the membrane confirms the diagnosis. However, I see no particular objection from the standpoint of pathology to make such separate distinction. I have always had an aversion to the exhaustive classification of many of our subjects. If we were in a position to uniformly examine the discharge from the uterus, we would find this organ more often sheds its endometrium as a cast than we are led to suppose. I have seen the most perfect casts of the uterine cavity or even more often the membrane shed in halves. One should be guarded in giving expert opinion regarding a suspicion of pregnancy in the unmarried from a careless examination of these casts, as they can be easily macroscopically confused with the decidua of pregnancy. We should not give a macroscopical opinion which would in any way question the chastity of woman. The finding microscopically of chorionic villi with their surrounding syncytium is the only sufficient proof of pregnancy. Decidual cells have been found in membranes cast from the unimpregnated woman.

Treatment.—The treatment of dysmenorrhea will try all of one's patience from the standpoints of both surgery and medicine. The surgical treatment varies from simple dilatation to hysterectomy. Hysterectomy for painful menstruation should only be done after all other remedies have been exhausted.

This radical step may be taken to prevent suicide, insanity or the drug habit. Do not ever suggest hysterectomy unless you have tried all other remedies and have made up your mind it is the only relief. If you suggested such a remedy to the patient she will often attempt to force same upon you. These patients will submit to any extreme means to be made comfortable from that hellish ever-returning monthly pain, as they term it.

For the treatment of obstructive forms of dysmenorrhea, the indications are clear, as I claim they are due to faulty surgery or tumor formation. It will be necessary to remove the remaining portion of the uterus after an amputation of the cervix which has been followed by dysmenorrhea.

Hysterectomy is also indicated in the obstructive form incident to tumor formation. I do vaginal hysterectomy in each case.

The treatment of spasmodic dysmenorrhea is dilatation of the cervix which will permanently relieve a good per cent. of cases. Some will return for a second or third dilatation, others are never relieved.

In the discussion of dysmenorrhea of the spasmodic variety, as in all forms of painful menstruation, the condition of the uterine appendages and the constitution of the patient are often determining factors of success or failure of operative treatment. Here even the judgment of the most skilled gynecologist may be overtaxed. For instance, if a painful menstruation is due to or aggravated by ovarian congestion, the patient is relieved by the recumbent position or those means which deplete pelvic congestion. A discussion along this line may be carried into all of those conditions which influence general health or local congestion. Do not give morphine for relief of monthly pain; the reasons are self-evident. I believe antipyrin will relieve painful menstruation more often than any other drug.

I close this interesting subject by saying, nurse the patient, do not drug her. By the phrase nurse the patient, I mean the practice of all things which may be crystallized under the term, good judgment; and good judgment may be neither surgical nor medical in application.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY

Forty-First Annual Meeting, Held at Washington, D. C., May 9, 10, 11, 1916.

The President, J. WESLEY BOVÉE, M. D., Washington, D. C., in the Chair.

DR. HARVEY W. WILEY, of Washington, D. C., delivered an address of welcome, which was responded to by DR. EDWARD P. DAVIS, of Philadelphia.

SYPHILIS IN ITS RELATION TO OBSTETRICAL AND GYNECOLOGICAL PRACTICE.*

Papers were presented by DRS. EDWARD P. DAVIS, SIGMUND POLLITZER, GEORGE GELLHORN and HUGO EHRENFEST.

THE FREQUENCY OF SYPHILIS IN OBSTETRIC PRACTICE.

DR. J. WHITRIDGE WILLIAMS, of Baltimore, stated that he had not been able to prepare a formal paper which he intended to do. What he would attempt to do was to follow up all cases during his service within the last five years presenting any indications of syphilis. This would mean sending out social workers and bringing the mothers back with their babies, without having Wassermann reactions taken, and without examinations having been made, and while this was being done he had not been able to complete the work.

Last year, at the meeting of the Association for the Prevention of Infant Mortality, he presented an analysis of the fetal deaths in 10,000 consecutive labors, including all children born after the seventh month, those dying at the time of labor and those dying the first two weeks of the puerperium. Of these 10,000 cases, there were 700 dead children; of these 700 dead children, roughly speaking, 26 per cent. was due to syphilis. Probably as many more were born alive and left the hospital at the end of two weeks either with signs of congenital syphilis or developed the disease later, so that he would say from his material in Baltimore that the incidence of syphilis in connection with obstetrics was about 5 per cent. In his material he has had an unusual incidence in that nearly half of the patients were colored women, and in his experience

* See this Journal for May.

in colored women syphilis was four or five times more common than in the white. In white women syphilis was probably concerned in about 2 per cent. of the cases and something like 8 or 10 per cent. in the black.

What he had hoped to be able to present this time as an analysis of the cases occurring in the last five years, tracing out what happened to the children born to syphilitic mothers, which did not die at the time of birth and which left the hospital shortly after they were born. He was not able to make a definite statement at this time, but he would endeavor to collect all of these cases and have the report ready for publication in full in the Transactions of the Society later.

THE SPECIFICITY OF THE WASSERMANN REACTION.

DR. RUDOLF BUHMAN, of St. Louis, Missouri (by invitation), in a paper on this subject referred to the frequency with which positive Wassermann reactions were obtained in diseases other than syphilis, as per the numerous reports in the literature, which was the incentive for his contribution.

The Wassermann reaction was made upon a series of cases, more of which presented any clinical evidence of syphilis, and only a few gave a vague history of the disease. The cases were selected from the abundance of material furnished at the Barnard Free Skin and Cancer Hospital.

The material investigated was divided into three groups:

TABLE I.—SKIN DISEASES.

Disease	Number	Negative	Positive	Weakly
Pityriasis rosea.....	8	8	None	None
Scabies.....	15	15	None	None
Dermatitis.....	5	5	None	None
Eczema.....	25	25	None	None
Total	53	53	None	None

TABLE II.—MALIGNANT DISEASES.

Disease	Number	Negative	Positive	Weakly
Sarcoma.....	12	12	None	None
Malignant adenoma.....	15	15	None	None
Glioma of brain.....	2	2	None	None
Carcinoma.....	107	96	9	2
Total	136	125	9	2

TABLE III.—MISCELLANEOUS DISEASES.

Disease	Number	Negative	Positive	Weakly
Trichinosis.....	3	3	None	None
Pernicious anemia.....	4	4	None	None
Hodgkin's disease.....	3	3	None	None
Sporotrichosis.....	3	3	None	None
Scarlet fever.....	15	15	None	None
Leprosy.....	6	3	3	None
Tuberculosis.....	35	33	2	None
Malaria.....	10	10	None	None
Arthritis.....	6	6	None	None
Meningitis.....	10	10	None	None
Streptococcus infection.....	4	4	None	None
Total.....	99	94	5	None

In Table I, comprising skin disease, there were 53 reactions made, with negative results in all of the cases.

In Table II, comprising malignant diseases, of the 136 cases, 125 gave negative reactions, 9 positive and 2 weakly positive. Of the 9 positive reacting cancer cases, 6 became negative, or remained only weakly positive under syphilitic treatment. The remaining 3 cases discontinued treatment or failed to return for later observation. The 2 weakly reacting ones were carcinomas of the cervix.

A microscopical examination was made in every case for confirmation.

In Table III, comprising various diseases, 99 reactions made, 94 reacted negatively and 5 positively. Three of the 5 positive reacting cases were tuberculous leprosy. The other 2 positive reacting cases were tuberculosis of the lungs, and in neither case could syphilis be excluded.

CONCLUSIONS.

A strong positive reaction, with proper controls and accurately titrated reagents, was conclusive evidence of syphilis, excepting a few diseases, which could easily be excluded clinically.

The diagnosis of syphilis could not be made upon a weakly positive Wassermann reaction, without some clinical evidence of the disease. A negative reaction did not exclude a syphilitic infection.

That malignant diseases did not give positive Wassermann reactions.

OBSERVATIONS ON THE OCCURRENCE OF SYPHILIS IN THE UNIVERSITY OF MICHIGAN OBSTETRICAL AND GYNECOLOGICAL CLINIC.

DR. REUBEN PETERSON, of Ann Arbor, Michigan, discussed this subject under the following heads: Syphilis in the obstetric clinic;

history of lues and correspondence with the results of Wassermann examinations; physical signs of syphilis; treatment during pregnancy and its effect; the results of Wassermann examinations on new-born infants; and syphilis in the gynecological clinic, after which he presented the following summary and conclusions:

1. Only by routine Wassermann tests will the obstetrician and gynecologist best serve the interests of his patients.

2. Especially is this true in hospital practice where even careful histories fail to arouse suspicion of latent syphilis.

3. Out of 2000 in-patients in the University Hospital, excluding two services, the proportion of syphilitics was 6 per cent.

4. The nature of the hospital material will determine the percentage of lues, but in the average hospital the ratio will not be far from 8 to 10 per cent. if the entire hospital population be included.

5. The same holds true for the proportion of syphilis in any special clinic, the percentage varying according to the nature of the material.

6. The percentage of lues in 381 cases in the University Maternity was 4.7 as shown by the Wassermann reactions and expert physical examinations.

7. In 18 cases of syphilis among the number examined, only 8 or less than half gave a history of lues.

8. In only the same number (8) were there positive physical signs of lues.

9. As shown by the histories of the 18 cases, there is a greater chance for the syphilitic mother treated by salvarsan and mercury to give birth to a living full-term child than where no treatment be given during pregnancy.

10. The new-born infants of the mothers so treated do not give positive Wassermann reactions, although undoubtedly they are syphilitic and later probably will show signs of the disease.

11. A certain proportion of the new-born children of untreated syphilitic mothers will give positive Wassermanns.

12. Out of 290 gynecological patients subjected to the Wassermann test, 22 or 5.6 per cent. gave positive reactions.

13. In only 5 of the 22 luetic patients was there a history of syphilis.

14. Hence the importance of such examinations or a serious general disease will be overlooked and the gynecological patient will remain uncured.

SOME REMARKS ON THE RELATIONSHIP OF SYPHILIS TO MISCARRIAGE AND FETAL ABNORMALITIES.

DR. FRED L. ADAIR, of Minneapolis, Minnesota, read a paper with this title which consisted of an analysis of 1095 obstetrical cases in whom there were 2773 pregnancies. In this series there were 2422 full-term pregnancies, 197 abortions, 62 miscarriages, 84 premature births and 8 unclassified cases.

There were 76 stillbirths, and 16 fetal malformations. These

cases were studied for evidence of syphilis by the Wassermann reaction, clinical and autopsy evidence.

In those cases giving a history of abortion there were 621 pregnancies in 109 cases. There were 197 abortions in these cases or approximately 1 to every 3 pregnancies.

There were 13 syphilitic cases in whom there were 74 pregnancies and 23 abortions, or approximately 1 to 3. In 83 cases without evidence of syphilis, there were 464 pregnancies and 142 abortions, or about 1 to 3. Apparently pregnancy did not end much more frequently during the first three months in those affected with syphilis than in those who were free from the disease. There were 40 cases who had 62 miscarriages in 202 pregnancies or approximately 1 to 3. There were 7 cases with syphilis who had 10 miscarriages in 27 pregnancies, or about 1 to 3. There were 30 cases without syphilis in whom there were 49 miscarriages in 161 pregnancies or approximately 1 to 3.

There were 68 cases with 84 premature births in 241 pregnancies or 1 to 3. There was evidence of syphilis in about one-third of these mothers. Congenital syphilis appeared in 5 of 50 infants born in the hospital. Thirteen of the 50 were stillborn, in 4 of which syphilis was demonstrated. This meant that 8 of 50 premature infants were proved syphilitic.

There were 66 mothers who had 76 stillbirths. The Wassermann reaction was positive in about one-tenth of these cases. Four of 34 infants born in the hospital were proved to be syphilitic or about 1 in 8.

Two of 16 deformed infants were born to syphilitic mothers. There was evidence of syphilis in 2 of 11 cases of hydramnios. Two of 5 cases of hemorrhage of the new-born were apparently due to syphilis.

DR. E. D. PLASS, of Baltimore (by invitation), demonstrated placental and fetal syphilis by numerous slides.

HOW CLOSELY DO THE WASSERMANN REACTION AND THE PLACENTAL HISTOLOGY AGREE IN THE DIAGNOSIS OF SYPHILIS?

DR. J. MORRIS SLEMONS, of New Haven, Connecticut, followed with a paper on this subject. The author stated that the Wassermann reaction in the mother's blood and the microscopic examination of the placenta were carried out in 260 consecutive confinements. The results were classified as follows:

Group	Wassermann	Placenta	Number of cases
I.....	Negative	Negative	335
II.....	Positive	Positive	10
III.....	Negative	Positive	1
IV.....	Positive	Negative	14

There was absolute agreement between the serological test and the result of study of the chorionic villi in 345 cases or 95 per cent.

Occasionally, 1 case in Group III, the placental findings were more reliable than the Wassermann.

Of the 14 cases in Group IV, there were only 2 with a strongly positive Wassermann (75 per cent. fixation). One of these was definitely syphilitic, indicating that the Wassermann might be more accurate than the placenta, and this was most likely to be true in postconceptional syphilis. The other patient with a strongly positive Wassermann almost certainly was not suffering from syphilis, but from a general streptococcus infection.

The other cases in Group IV presented from 25 to 50 per cent. fixation (8 cases gave a single plus and 4 cases a double plus. Ten patients with eclampsia or allied autointoxications presented mild fixation and the phenomenon must be attributable to the metabolic disturbance. In 2 cases, with none of the familiar symptoms of autointoxication, there was slight fixation. The cholesterol content of the blood did not account for the serological phenomenon.

Accurate diagnosis of syphilis in obstetrical patients required both the Wassermann reaction and the study of the placenta. The freshly teased chorionic villi should be examined routinely. If their appearance raised the suspicion of syphilis, hardened and stained sections of the placenta must be studied and the Wassermann reaction in the mother's blood must be determined. Irrespective of the teased villi, both these observations should be made whenever the fetus was premature, macerated or stillborn.

EXPERIMENTAL SYPHILIS.

Dr. F. W. BAESLACK of Detroit, Michigan (by invitation), stated that the causal relationship of the *treponema pallidum* to lues was established by (a) the observation of the occurrence of the organisms in the syphilitic lesions incident to the various stages of the disease. The distribution of the pallida in the lesions of acquired and congenital syphilis (b). The successful inoculation of lower animals from human lesions, thereby producing syphilis experimentally in rabbits, monkeys and other animals. The methods employed and a discussion of the character of the lesions; and the observation of generalized syphilis in experimentally inoculated animals (c). The growing of the *treponema pallidum* in culture media free from contamination, and the transfer of these cultures through many generations and the successful inoculation of lower animals with the cultivated organisms; also the loss of virulence of the organisms against the lower animals after extended cultivation, and the cultural characteristics and morphology of the pallida (d). Immunological studies; pseudoprimary lesions, and true reinfection, as well as superinfection as expressed in the lesions in the various stages of syphilis, did not harmonize with the conception of immunity.

The author referred to attempts at immunization by means of pallida vaccines. He spoke of the occurrence of agglutinins in the

serum of animals treated with suspensions of dead *pallida*, as well as the absence of immunity, as demonstrated by the ability to reinoculate animals which had recovered spontaneously or subsequent to treatment. Reference was made to the altered reactivity of the body, and a possible explanation offered for the occurrence of the lesions peculiar to the various stages of syphilis.

SYPHILIS OF THE BODY OF THE UTERUS

DR. CHARLES C. NORRIS of Philadelphia, Pennsylvania, said that it was only since the discovery of the *spirochaeta pallida* and the development of the Wassermann test that the true frequency of syphilis had been recognized. Probably 1 to 4 per cent. of women were syphilitic. The disease was rare in the body of the uterus. Theoretically chancres might occur in the body of the uterus as the result of spermatozoic infection and this avenue of ingress might account for some of the cases of syphilis which developed without demonstrable primary sore. No chancre had, however, ever been demonstrated in this location. Some authors believed mucous patches might occur in the endometrium. This, however, was unproven.

There were two varieties of syphilitic endometritis: (a) gummatous, and (b) a less characteristic form in which the blood-vessels were especially affected. Syphilis of the myometrium occurred as gumma and a diffuse metritis, the most characteristic lesions of which were in the blood-vessels. Many cases were reported as syphilis on insufficient grounds. Hemorrhage in the form of menorrhagia was a frequent symptom. Leukorrhea and pain occurred. The author reported the following case:

Patient, aged thirty-six years; married twelve years; iii-para; last child seven years ago. Six years ago the woman contracted syphilis, and since then had had three miscarriages, two, three, and five months respectively, the last one six months ago. Patient was under mixed treatment until nine months ago. Menorrhagia developed five months ago. Hemorrhages were profuse, and produced severe anemia with its accompanying symptoms. When she was brought to the hospital she had been bleeding twelve days. Physical, abdominal and pelvic examinations were negative. Hemoglobin, 52; red blood count, 5,000,000; white blood count, 4500. Wassermann reaction strongly positive. Diagnostic curettage was resorted to during which the fundus was perforated. Because of the age of the patient, three living children, history of intractable bleeding and perforation of the uterus, a supravaginal hysterectomy was performed. Her convalescence was normal. Salvarsan was administered. A pathological examination of the specimen showed the uterus normal in size and shape, but so friable that its walls could be squeezed through at any point with thumb and forefinger. Histological examination showed endometrium slightly thickened and infiltrated with chronic inflammatory products. There was angiosclerosis of the vessels.

The myometrium was more or less inflamed, and there was much edema. There was marked angiosclerosis of vessels and complete obliteration of some. The inner coats of the vessels were chiefly affected. The lymphatic spaces were dilated. In many fields the muscle fibers were partially separated from one another.

The diagnosis of syphilis in this case was not positive as spirochætæ were not demonstrated or searched for. The etiology was not suspected, and the Wassermann report was not secured until some days following the operation by which time the specimen had been fixed in formalin solution, thereby making the demonstration of the spirochætæ pallida very difficult.

The diagnosis was based upon the following: That the patient contracted syphilis years ago, and since then had had three miscarriages; that the symptoms referable to the uterus developed three months after cessation of antisyphilitic treatment, and one month after the last miscarriage; that these were the symptoms usually produced by syphilis of the uterine body; that the histological findings, especially the blood-vessel changes, were those of syphilis. The hemorrhage and discharge were not the result of pyogenic infection following a miscarriage, as they did not occur with either of the two former miscarriages, but developed one month after the last.

These facts led the author to ascribe the uterine lesions to syphilis. Three similar cases were recorded in the literature.

The author's paper contained a review of the literature of syphilis of the uterus to date.

SYPHILITIC FEVER IN RELATION TO GYNECOLOGICAL AND OBSTETRICAL PRACTICE.

DR. FREDERICK J. TAUSSIG of St. Louis, Missouri, stated that the rare mention of this symptom in gynecological literature was out of proportion to the comparative frequency of its occurrence. A positive diagnosis of syphilitic fever could only rarely be made, but the diagnosis could be made with great probability in certain groups of cases.

The author divided syphilitic fever into:

1. Secondary syphilitic fever occurring at the outbreak of the eruption, lasting usually only three to four days with a rise of temperature to 99.5 or 100°. Fournier estimated that the symptom occurred in 20 per cent. of all syphilitics.

2. Late secondary syphilitic fever might complicate pregnancy or gynecological conditions; it was usually prolonged with a higher degree of temperature. The writer cited several cases, one of which had been diagnosed as typhoid. In these cases the diagnosis was based upon the positive history and evidence of a syphilitic infection, the exclusion of other febrile diseases, and the immediate and permanent results of antisyphilitic treatment.

3. Tertiary syphilitic fever was of greater diagnostic importance than the two previous groups because the symptoms and history of syphilis were often absent and only the 4 plus Wassermann pointed

the way to an interpretation of the continuous fever. Eighty-three cases of tertiary syphilitic fever occurring in literature were analyzed, including one case in the author's experience in which pelvic gumata were responsible for the fever.

The cause of syphilitic fever was, in all likelihood, to be found in the entrance of spirochete toxins, in addition to the organisms themselves, into the circulation. Probably individual predisposition was also an important factor in the rise of temperature. The fever occurring occasionally after injections of mercury or salvarsan when it might be fairly assumed large quantities of endotoxins were liberated from the dead spirochetes, was additional confirmation of the toxic interpretation of syphilitic fever.

The author summarized as follows:

1. The diagnosis of syphilitic fever could rarely be made with absolute certainty, but we should more often consider it as a possibility and institute antiluetic measures in suitable cases.

2. Secondary syphilitic fever occurred in a mild form in 20 per cent. of patients at the outbreak of the rash and at times was prolonged and more severe in its course.

3. Late secondary syphilitic fever was occasionally seen in a pronounced form after confinement or in gynecological patients.

4. Tertiary syphilitic fever was practically never due to syphilitic lesions in the female genital tract. One such case was reported by the author. It might, however, complicate a gynecological or obstetrical condition, and owing to the difficulty of locating the site of the tertiary lesion, lead to a wrong diagnosis as to the cause of the fever. All doubtful cases should be subjected to a Wassermann test and, if positive, given antiluetic treatment.

5. Syphilitic fever was probably due to the reaction of the body to the toxins produced by the spirochete which under certain circumstances or in certain individuals gained an entrance to the circulation.

DR. J. WHITRIDGE WILLIAMS, of Baltimore, Maryland, had been interested in the subject of syphilis every since he had had charge of the obstetrical service in the Johns Hopkins Hospital. From that time every placenta which had gone through his hands had been examined microscopically, and he had in this way made a diagnosis of syphilis with great accuracy and satisfaction to himself long before the Wassermann reaction was discovered and long before the spirochete was known.

One of the things that interested him in Dr. Pollitzer's paper was the positive stand he took against Colles' law. Colles' law was the dictum that stated a woman might have syphilitic children by a syphilitic father and be immune to syphilis herself, and before the Wassermann reaction was discovered that was generally believed, but after the Wassermann reaction had been discovered, and it was

found that the great majority of the women representing Colles' law had a positive Wassermann, the question arose how could that be explained. It meant that these women had latent syphilis or it meant something was transmitted to them through the fetus which gave a positive Wassermann. In Germany the position was taken that these women had latent syphilis; therefore, the syphilitic children did not occur from the fathers at all, but from the mothers, and the tendency had been in the last few years to deny Colles' law absolutely. He thought the tendency to do away with Colles' law entirely was probably a step in the wrong direction.

He cited the case of a colored woman, who had changed her name on several occasions, and who had a very unique obstetric experience. She had had seventeen full-term labors, all but two of which occurred in his service. This woman had had sixteen babies, because she had twins once, under his observation. The first two labors occurred elsewhere. She then had three perfectly normal labors, large babies, normal placenta. Her sixth pregnancy resulted in double ovum twins, one child being born alive, with a perfectly normal placenta, while one child was born dead, with a syphilitic placenta, and the autopsy made by a pathologist showed a diagnosis of congenital lues. Following that twin pregnancy she had eleven other babies in his service; every baby was born alive; every baby weighed over 8 pounds, and every placenta was normal. This syphilitic baby was the only one which died either at the time of labor or in the first few years of life.

When he came to inquire into the woman's history, he found that she was perfectly frank in saying that she had had sexual intercourse with a lover at the same time that she had sexual intercourse with her husband, and when he traced the lover's history he found he was a syphilitic under treatment in the genitourinary dispensary. It was his belief in this case the woman had an example of superfecundation by her husband, her normal man, and the syphilitic lover was the father of the syphilitic child. This woman never presented any sign of syphilis after a Wassermann test. He got repeated Wassermans and they were constantly negative.

This was the most conclusive case with which he was familiar as being in favor of Colles' law.

DR. BROOKE M. ANSPACH, of Philadelphia, in speaking for Dr. Williams, of Philadelphia, stated that he (Dr. Williams) and Dr. Kolmer had been interested in the incidence of syphilis that occurred in gynecological cases and had taken a series of 300 patients in the gynecological and obstetrical services of the hospitals with which they were connected and had found a positive reaction in 22.6 per cent. He would not present all of the notes written by Dr. Williams, but Dr. Williams was particularly interested in the relatively high percentage of positive reactions observed in the following conditions: A positive reaction was obtained in 75 per cent. of stillbirths; 50 per cent. in rectal disease; 43 per cent. in abortions; 36 per cent. in pelvic inflammatory cases; 16 per cent. in fibroid tumors of the uterus, and 17 per cent. in cases of pregnancy.

There seemed to be a decided difference between negroes and white women. In the negroes there were 35.8 per cent. positive reactions as compared with 22.2 per cent. in the white women. Some of these reactions, which were put down as positive, he thought were weakly positive, and his impression was that must be an error, and that the incidence of the percentage of syphilis would not be as high as it seemed at present.

So far as gross conditions in the pelvis were concerned, lesions of the uterus, tubes and ovaries in relation to syphilis, he did not see why we should expect many lesions there, although syphilis was a constitutional disease and not local. One might look for gonorrhea or for infections of tumors, and the principal manifestations in the secondary stage or the surface manifestations. In a certain class of cases in the Philadelphia Hospital there was seen a lot of external manifestations of syphilis about the external genitalia, but in private practice he had almost never seen them.

DR. COLLIN FOULKROD, of Philadelphia, in referring to syphilitic fever recalled having seen one case, and this was observed quite a number of years ago in out-patient work in Philadelphia. In the first part of pregnancy the patient developed fever, which was diagnosed as typho-malarial. The patient was cared for and observed for six weeks until finally the conclusion was reached that the fever was due to syphilis without any antisiphilitic treatment having been given at the time. Patient was given a dose of salvarsan, but it was not repeated for a week or ten days at which time the fever was running 101.2° . After finding the patient was losing ground they decided to give another dose of salvarsan, which was done, and the next day the temperature came down to normal and remained so. Patient passed through a normal convalescence.

DR. FRED L. ADAIR, of Minneapolis, Minnesota, stated that there were two points he did not make in his paper, one of which was in regard to hydramnios. He had found two cases out of eleven associated with syphilis, in one of which there were definite evidences of congenital syphilis. In association with hemorrhage of the new-born out of five cases he found two that were definitely syphilitic. This was an important point, and while it had not received attention other than casually, he did not think it had been sufficiently emphasized that syphilis was a fairly frequent accompaniment, if not the cause, of hemorrhage in the new-born.

Relative to habitual abortion, he had had only three cases of well-marked habitual abortion, but in none of these was he able to demonstrate syphilis by the Wassermann test or other reactions.

The incidence of syphilis in his series of cases was between 5 and 6 per cent. The incidence of syphilis in the macerated fetuses was approximately 50 per cent. In the still births the cases in which syphilis was demonstrable made up approximately 25 per cent., and in premature births approximately 15 per cent.

DR. J. MORRIS SLEMONS, of New Haven, Connecticut, pointed out that the diagnosis of syphilis was made too frequently in early infancy. This opinion depended upon the fact that he kept in close

touch with infants after they were given up by the obstetrical department, and he found frequently that in the pediatric clinic the appearance of snuffles or sore buttocks or skin lesions was without further evidence simply considered enough to say that the child had congenital syphilis. It was for this reason the obstetrician should supply the pediatrician with every particle of available evidence which was at his disposal. The placenta should be examined in every case. If one depended upon the placenta alone, he would miss some of the cases. On the other hand, if the Wassermann reaction was depended on diagnosis would be made too frequently of syphilis and under such circumstances both tests should be made.

DR. FREDERICK J. TAUSSIG, of St. Louis, Missouri, had occasion to see a patient in the city hospital in whom there were secondary manifestations of syphilis with a four plus Wassermann in which there were whitish plaques upon the cervix. A piece of the cervix was removed for histological examination and a typical histological picture of leukoplakia was presented.

DR. HUGO EHRENFEST, of St. Louis, Missouri, spoke on the question of paternal infection, saying it had in some respects been considered in their joint essay. Dr. Davis defended the point of so-called paternal infection and the possibility of an infected spermatozoon entering the ovum, in this way starting an infection in the forming fetus. Dr. Pollitzer probably more in harmony with present-day views objected to that conception. He pointed out the work of Muratow and others to assume the possibility that the spirochete could enter the ovum with the spermatozoon. He said they mentioned among other things in their joint paper the fact that spirochete could be found in the cervical secretion, but the woman at that time did not have any evidence of syphilis. They had made smears of the cervix in one case and found typical spirochetæ. He ordered a Wassermann taken and found a four plus Wassermann and the husband was, at the same time, in a hospital with syphilis, although the woman had no evidences of syphilis at the time.

As to the use of salvarsan, Dr. Davis warned against it in pregnancy and syphilis. He was not able to give any particular figures. In the case that was mentioned by Dr. Taussig and Dr. Foulkrod, the patient was at the end of the eruptive stage, she having been treated for typhoid. She was kept on salvarsan during that pregnancy and carried to full term. In the City Hospital of St. Louis, they had used salvarsan for the treatment of syphilis in pregnancy, and he was personally under the impression that salvarsan did not show any particular deleterious effect upon the fetus.

DR. GEORGE GELLHORN, of St. Louis, Missouri, in referring to the paper of Dr. Norris, said he was glad to see that Dr. Norris had accepted the suggestion that the so-called syphilitic menorrhagia had nothing to do with the uterus itself, and that it depended almost altogether not upon the local lesion of the ovary but upon the systemic poisoning which the spirochete had upon the function of the ovary. The case, however, of syphilis of the uterus did not seem

convincing to him. Here was a patient who had had syphilitic infection and subsequent lues, she had had three abortions, the last one of the three taking place five months previous to the date of her entering the hospital. Upon dilating and cureting the uterus was perforated. The friability of the uterus need not necessarily be considered syphilitic. More convincing proof should be adduced to show that the changes in the uterus were absolutely syphilitic, for the histological picture of the syphilitic uterus was not pathognomonic. There were the same changes in the blood-vessels and perivascular infiltration in all chronic inflammations, and he would rather think the perforation in this case was due to the abnormal friability brought about by the repeated miscarriages which had occurred in a fairly short period of time.

The reason why primary chancres were not observed more frequently in the uterus, tubes and ovaries, was obviously due to the affinity of the *spirocheta pallida* for squamous-cell epithelium.

As to the infectiousness of physiological secretions in a syphilitic woman, it was known that syphilitic affections, syphilitic ulcers and chancres were full of *spirochetæ* and were, therefore, highly infectious. But if a woman was syphilitic and had no local manifestation upon the vulva, the vagina or the cervix, she yet might be highly infectious. Rosenberg had succeeded in finding *spirochetæ* in four cases in the cervical secretion in an otherwise normal uterus, and Dr. Gellhorn had succeeded twice in demonstrating *spirochetæ* in women who had absolutely no local manifestations upon the genital tract, and in whom the cervical secretions were absolutely clear and normal. The practical value was evident.

Hereafter more attention must be paid to the routine examination of the physiological secretions in syphilitic women. The time was not far distant when a practical examination of cervical secretions would be just as much a routine as the search for gonococci.

THE VARIATIONS IN THE BLOOD SUPPLY OF THE OVARY AND THEIR POSSIBLE OPERATIVE IMPORTANCE.

DR. JOHN A. SAMPSON, of Albany, New York.—The study of the blood supply of the ovary was undertaken for its anatomical interest and for its bearing on conservative ovarian surgery, when a tube was removed without removing the ovary of that side, or the uterus was removed leaving one or both ovaries. The intrinsic blood-vessels of the ovary and resection of that organ were not considered.

The material consisted of six fetal tubes and ovaries and thirty adult ones in which the arteries had been injected with bismuth, and ten adult tubes and ovaries in which the veins had been injected. The specimens were studied by means of stereoscopic radiographs, and for the sake of comparison ink tracings were made of the blood-vessels on prints, using the stereoscope as a guide in following the course of the individual vessels. The prints were then bleached, leaving the tracing.

The terminal portion of the uterine artery presented variations in its branching and distribution of those branches. This artery directly or indirectly through its branches supplied a varying portion of the ovary in all, the entire tube in six, the greater portion of the tube in twenty-three, the round ligament and greater portion of the broad ligament in all but one.

In twenty-four of the thirty specimens the ovarian artery on approaching the ovary divided into two main branches, a lateral tuboovarian or tubal branch and a mesial ovarian, the latter anastomosing with the ovarian branch of the uterine. In six specimens the lateral tubal branch was absent. The ovarian artery supplied a varying portion of the ovary in all, the distal portion of the tube in twenty-four and portions of the broad ligament in all, but the latter to a lesser degree than the uterine.

The actual blood supply of the ovary was a divided one, uterine and ovarian. In twenty-six of the thirty specimens the uterine supplied the proximal portion of the ovary and the ovarian the distal. The four specimens (four of six in which the lateral ovarian branch to the tube was absent), the lateral tubal artery arose from the main tubal artery (uterine artery) and supplied the distal portion of the ovary, taking the place of the lateral tuboovarian branch from the ovarian artery. In these four specimens the distal portion of the ovary was supplied by the uterine, the middle by the ovarian and the proximal by the uterine.

The blood supply of the broad ligament being both uterine and ovarian, the usual blood supply of the tubes being both uterine and ovarian, as the arteries of the broad ligament communicated with each other and with those of the tube and round ligament, and as the tubal arteries communicated with each other, all those structures must be looked upon as containing a potential blood supply to the ovary. Thus the uterine and ovarian arteries communicated with each other not only through the well-known uteroovarian anastomosis, but also through the above-mentioned vessels.

The actual venous outlet of the ovary was partly through the ovarian veins, partly through the uterine. Its potential venous outlet was evident in the various communications between the venous channels of the uteroovarian plexus, the free anastomosis of the veins of the broad ligament and tube, and the communication of the plexus with the epigastric vein of the round ligament.

The removal of the tube always encroached upon the potential blood supply of the ovary and when the distal pole of the ovary was supplied by the tubal artery (four of thirty specimens), the actual blood supply of that portion of the ovary might be cut off.

Anatomical studies suggested that if it was necessary to remove a tube without removing the ovary, it should be done with the least possible disturbance of the broad ligament, and even then occasionally the blood supply of the distal pole of the ovary would be cut off; also in hysterectomy with conservation of the ovary the accompanying tube should be saved, if possible.

DISCUSSION.

DR. ROBERT L. DICKINSON, of Brooklyn, stated that a point in vaginal hysterectomy was to save the uterine artery as it ran up the side of the uterus, so that in most of the chronic cases of metritis with incurable menorrhagia, in doing a vaginal hysterectomy one purposely left the side of the uterus, whipping over and over by the continuous stitch which he had published, sewing the two edges of the uterus together and leaving the uterine blood supply to nourish the ovary in such cases as were pointed out by Dr. Sampson. This was also feasible in the hysterectomies by the vagina for the removal of fibroid tumors which did not involve the broad ligaments.

DR. HUGO EHRENFEST, of St. Louis, referred to the blood supply in the attempt to preserve the function of the ovary, and asked Dr. Sampson whether this question had not a very important bearing upon the unfortunate sequelæ in the preservation of such ovaries, very small cystic ovaries, etc.

Just before he left St. Louis to attend the meeting he did a laparotomy on an old case of tuberculosis of the tube in which one ovary was preserved and transformed into a troublesome cystic ovary. If such a tube was removed, would not the blood supply thrown into the ovary be a cause of cystic degeneration?

DR. WILLIAM M. POLK, of New York, said the very complete demonstration made by Dr. Sampson upon the blood supply had undoubtedly brought him in close connection with the nerve supply, and especially with the forces of the sympathetic nervous system which, centering as they do about the lower portion of the posterior aspect of the cervico-uterine region, bore materially upon the nutrition of the entire region, and must be more or less injured in any operation done for removal.

Dr. Sampson, in answering the question of Dr. Ehrenfest, said it was impossible to study the effect on the ovary as regards interfering with its blood supply. Clinical experience had taught us that in conservative ovarian surgery cystic ovaries might arise which would subsequently require operative interference. He could not tell the exact effect on the ovary from interfering with its blood supply. He undertook these studies primarily for their anatomical interest and they seemed to have some surgical importance.

As to the nerves of the pelvic organs, he had tried to study them for several years, but had not been successful. He had rather confined himself to the study of the blood supply because he got more out of it, but he had not been successful in studying the nerves and the lymphatics.

INCONTINENCE OF URINE IN WOMEN.

DR. HOWARD C. TAYLOR, of New York City, said that incontinence of urine would be found frequently if patients were asked direct questions regarding it. Without direct questions, women would speak

of the leakage only if the incontinence was sufficiently marked to cause constant wetting. For some years, both in private and hospital work, he had made a record of the patient's control of the urine a part of the routine history. The degree of this control had been recorded as normal, fair, poor or lost. A normal control needed no explanation. A fair control was one that was normal except on special occasions, such for example as overdistention of the bladder, temporary vesical irritability, times of mental or physical fatigue, etc. A poor control was one that allowed the urine to escape on any special abdominal strain, such as coughing, laughing, sneezing, or with active exercise, such as golf, tennis, etc. Such patients were wet most of the time. When the control was lost the urine continually dribbled from the patient and practically no urine was retained in the bladder. Obviously this classification was arbitrary and inexact and one class merged with another.

To determine the frequency of disturbance of control of the urine in women, he had examined the records of 1006 cases in the gynecological service of the Roosevelt Hospital. The results of this examination were given. It was found that the control was normal in 79.4 per cent., fair in 6.8 per cent., poor in 12.4 per cent., and lost in 2.0 per cent. That was, in about 15 per cent. of patients admitted to a gynecological service in a general hospital, the inefficient control of the urine was such that the leakage constituted a disagreeable symptom to the patient.

The nature of the pelvic lesion for which the patient applied for relief was found, as would be expected, to influence the percentage of cases of abnormal urinary control. Abnormal urinary control was found in 13 per cent. of the inflammatory, 20 per cent. of the fibromyomata and 45 per cent. of the prolapse cases.

The treatment of incontinence of urine due to lesions inside the sphincter was to relieve the irritability of the bladder. The incontinence of urine in these cases was temporary and was easily corrected. The lesions in the sphincter vesicæ itself which caused urinary incontinence and which required definite treatment were the partial destruction and overstretching of the muscles. The treatment of incontinence of urine due to actual destruction of the sphincter muscle consisting in exposing and reuniting divided ends of the sphincter muscle. The operation was always difficult and the prognosis was uncertain. A successful case of this kind was reported by Brickner. It might also be necessary to reconstruct the urethra. The operation which he usually performed for overstretching of the sphincter vesicæ for incontinence of urine was one that was intended to produce an infolding of the sphincter vesicæ and the adjacent parts of the neck of the bladder and urethra. This was accomplished by two or more mattress sutures of fine chromic catgut which included about one-third of the circumference of the urethra. No attempt was made to expose the sphincter muscle itself, but the fibrous tissue in its immediate vicinity was included in the sutures.

Illustrative cases were cited.

The author drew the following conclusions: 1. While incontinence of urine was due to a lesion of the sphincter vesicæ only, it was relatively an infrequent symptom. 2. Incontinence of urine due to the sphincter vesicæ associated with other lesions was a frequent and important condition. 3. In pelvic operations for lesions associated with incontinence of urine as a symptom, care should be used to remove all drag or downward traction on the anterior vaginal wall and frequently to infold the sphincter vesicæ.

DISCUSSION.

DR. FREDERICK J. TAUSSIG, of St. Louis, stated that in severe cases of urinary incontinence there was often complete obstruction of the urethra. He had had occasion to try a rather unusual experiment. A patient had been operated on three times by prominent surgeons in Philadelphia and Baltimore, and the operative problem was very difficult. There was no sphincter to be found and no urethral wall to make a plastic upon. He, therefore, thought it worth while to utilize the anterior portion of the levator ani muscle from one side, and pulling it underneath the vagina wall, bringing it directly in the urethra and fastening it on both sides with catgut, being careful to preserve the blood supply of the muscle thus transplanted. The operative result, while not perfect, was a great improvement on anything done before, in that the patient was able to retain from 5 to 6 ounces of urine.

Dr. Taylor's recommendation of the use of a pessary coincided with his own experience.

DR. PHILANDER A. HARRIS, of Paterson, New Jersey, had performed different operations from year to year for the relief of incontinence. First, the twisting operation of the urethra, then vertical cutting and horizontal sewing, gathering the tissues beneath the urethra, and his experience had not been very satisfactory. He had ceased performing such operations about eight or nine years ago and was now resorting to topical applications.

DR. HERMAN J. BOLDT, of New York City, referred to the technic for determining the exact location of the sphincter. While the mushroom catheter was a very exact method of determining the precise point where the urethra entered the bladder, where we had the vesical sphincter it was a soft structure and did not give us exactly what we wanted, and he had therefore resorted to the following measure: the bladder should be distended and then an ordinary glass catheter used, and at the point where we introduce it, the catheter should penetrate the sphincter where the contents of the bladder came out; this point was noted and an exact measurement taken to see exactly where the vesical sphincter was located, and having obtained the measurements one could cut down and get the sphincter.

As to the sutures, on one occasion, about three years ago, he had a case of extensive injury of the bladder involving the neck so that half of the vesical sphincter was destroyed. He found that he was able to get, at the first attempt at surgical intervention, a satis-

factory result, but he took a very large bite around the vesical sphincter and tied the sutures over a small glass catheter, using two or three sutures. It did not make any difference whether one took the extreme vesical end of the bladder with the sphincter or not; one could take the vesical end near the sphincter and leave a part of the urethra, that is, the nearest part of the urethra to the sphincter. His results had been that about one-third of these patients which Dr. Taylor had classed under poor control or no control would be cured.

DR. THOMAS J. WATKINS, of Chicago, confined his remarks to cases encountered in the study and treatment of prolapse of the uterus. If the urethra was not much displaced, the extent and nature of the displacement could be determined by pressing the urethra up toward and in the line of the cervix, and the extent to which the urethra could be so displaced was equal to the amount of displacement.

In placing the sutures for prolapsus he had placed them so that when they were tied the urethra would be drawn up to a point where it was comparatively fixed, which was normal with the urethra. If the sutures brought the urethra up to the point where it did not move much, then it was fair to assume the urethra was put back into its normal location. This fixture had been in the bad cases of prolapsus after the menopause where the transposition operation had been done, the sutures having drawn the urethra up, going through the fundus of the uterus. In some of the other cases during the reproductive period loops of the round ligaments had been satisfactorily used for that purpose. In a few cases the upper part of the cervix or the lower uterine segment had been used. There were some unsatisfactory results, but in others it had shortened the anterior vaginal wall. As to the results, it was invariably found that the partial incontinence of urine had been relieved.

DR. ROBERT L. DICKINSON, of Brooklyn, stated that in cases of incontinence of urine in females it behooved the gynecologist and cystoscopist to examine every case. In using the Kelly cystoscope one could tell whether there was dilatation or spasm of the upper part of the urethra. Where the element of spasm had occurred dilatation should be resorted to.

DR. GEORGE H. NOBLE, of Atlanta, Georgia, said that not infrequently young women suffered from urinary incontinence on account of hypothyroidism, and he had found that these patients would do well under the administration of thyroid extract alone. In older women, in whom there were slight lesions in the pelvis, particularly relaxation, where the urethra rotated under the pubic arch, there might or might not be displacement of the uterus. Relaxation and rotation of the urethra under the pubic arch put the veins upon a certain amount of tension so that they did not empty themselves. The nerve supply and nutrition were interfered with, there was a certain amount of edema, and a certain amount of relaxation of the muscle, etc. In such cases, carrying back and anchoring the urethra behind the pubic arch by one of the many methods in use or by the inter-

position operation, or anchoring the rectovesical fascia, would enable these patients to empty their bladders.

DR. GIDEON BROWN MILLER, of Washington, D. C., had had two or three cases of very troublesome bladders following the interposition operation. If one took a woman with an irritable, chronically inflamed bladder, and disturbed its blood supply and normal relations by putting the uterus under the trigonum, so to speak, he would naturally expect an increase of the symptoms, and in two cases he had had the symptoms were markedly increased by the interposition operation.

DR. TAYLOR, in closing, pointed out that in addition to drawing up the urethra, he would emphasize the advisability of infolding the sphincter. Drawing up the urethra would cure a great percentage of these cases, and the percentage of cases could be increased if in addition the sphincter was infolded at the same time.

PRESIDENTIAL ADDRESS: NOTES ON THE PAST, PRESENT AND FUTURE
OF GYNECOLOGY, OBSTETRICS AND ABDOMINAL SURGERY.

DR. J. WESLEY BOVÉE, of Washington, D. C., in his presidential address referred to the work and ingenuity of Sims in the treatment of vesicovaginal fistulæ, which, he said, would ever serve as a stimulus for the disheartened struggling against formidable agencies in various and devious avenues of study of the mysteries of the living human body and the amelioration of its ailments. The work of his faithful pupil, Bozeman, in this sphere cannot but arouse admiration. Even Sims was not entirely uninfluenced by besetting disappointments and surgical failures, for he was known to have become so disheartened in his work in the south that he sold his property and arranged to embark elsewhere upon a business career. Had not the New York clothing merchants not violated their contract at this juncture most likely medicine would have been deprived of the aid of this wonderful man and the human family of the benefit of his medical researches.

The plastic work of the eldest Emmet, and the great work of Thomas, Polk and Fordyce Barker would always be appreciated. The plastic perineal surgery of J. Collins Warren, the round ligament operations for the rectification of posterior uterine displacements, associated with the names of Dudley, Mann, Wylie, Simpson, G. H. Noble, Andrews and others remained familiar to us all. Not to refer to Hodge, Parvin, Meigs and Oliver Wendell Holmes was to slight obstetrics with its other great geniuses.

We must recall with American pride the impetus to urinary surgery given by Kelly who popularized direct cystoscopy and ureteral and renal exploration by its aid as well as the advanced work of several Americans in the scientific treatment of urinary diseases. The work of Goffe and Baer invoked a great advance in the surgical treatment of uterine fibromata. C. P. Noble, by his careful and laborious study into the complications and degenerations of these neoplasms rendered an invaluable service.

Of the splendid work of the past gynecology had not neglected the great subject of cancer. This disease as it affected women was almost limited to their reproductive organs. The uterus was the organ most commonly invaded by it. Probably Wrisberg and Montaggia were the first to recommend total hysterectomy for its eradication. Marshall, in 1783, and Langenbeck, in 1813, were the first to perform this operation, though, in their cases the uterus protruded from each patient. In 1814, Gutberlet recommended hysterectomy by a special suprapubic method. In 1822, Sauter, of Constance, first performed vaginal hysterectomy for cancer of the uterus, *in situ*. Recamier, in 1829, recommended a special plan of vaginal hysterectomy and the following year Delpech proposed a combined abdominal and vaginal procedure. To the lover of medical history it was interesting to read the comments upon these operations made by medical writers during the next few years.

Of obstetrics one must speak with considerable reserve. The untrained obstetrician had been the weak spot in our preparedness. The famous teachers—Parvin, Barker and others did not, to a desirable extent, impress our profession with the importance of this specialty. This, no doubt, was in part due to its being a heritage from the midwife, who had striven to claim it as a possession. In later years an earnest effort had been made by a few very efficient teachers to secure to obstetrics a proper recognition. The vigorous propaganda by Williams had probably aroused the medical schools to an appreciation of the necessity for much better facilities for real teaching of obstetrics.

In abdominal surgery the dread of dire results from sepsis, ignorance, shock, hemorrhage and several other former causes of needless mortality had nearly vanished. While problems in this field of endeavor remained unsolved, diseases of the abdomen were much better understood than formerly. Various aids were now being employed to assist in the diagnosis or treatment of pelvic and abdominal diseases, and he would dare say they would have notable extensions. The Röntgen ray had greatly assisted in the discovery and location of adhesions, neoplasms, ulcers and stasis of the stomach and intestine, determining the presence or absence of biliary, renal and ureteral calculi and indeed, with the ureteral catheter, was an extremely reliable agent for determining whether urinary calculi above the bladder existed. We were justified in believing it would prove of great value in diagnosing pregnancy and various abdominal and pelvic tumors.

The treatment of cancer of the uterine cervix continued to receive the very earnest attention of gynecologists and special activity in the general subject of cancer during the past three years had been enthusiastically aided by this society. Thus far the cause of cancer had not been found and no doubt this must be discovered before we might reasonably expect to gain a mastery over this dreadful disease. Its behavior, as influenced by radium and long continued, slightly elevated temperature. The use of certain rays from radium seemed to retard its progress and perhaps completely de-

stroyed it, while other rays from it were thought to induce the disease. If the latter was a fact we might well refuse to believe, for the present, that cancer was of microbic nature.

In abdominal and pelvic surgery at its present stage of development, probably no more important matter was before us than the prevention and correction of intraperitoneal adhesions. A propaganda on this subject should result in untold lessening of human suffering.

Surely, there were very many grave problems to be solved in the fields of endeavor gynecologists represented, but he was fully confident this society would in the future maintain in that work the prestige that had come from the high character of work it had performed.

(To be continued.)

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of March 2, 1916.

The President, WILLIAM R. NICHOLSON, M. D., in the Chair.

DR. BARTON COOKE HIRST read a paper on

THE TRAINING IN OBSTETRICS THAT THE STATE SHOULD DEMAND
BEFORE LICENSING A PHYSICIAN TO PRACTISE.*

DISCUSSION.

DR. EDWARD P. DAVIS.—With much that is contained in Dr. Hirst's paper, I am in full accord. The questions suggested by this paper are complex, and many points must be considered.

Undoubtedly the clinical side of instruction in obstetrics needs further development, and the point of the paper is well taken that time allotted for such instruction is much too short. At least three consecutive hours should be given for such teaching.

In what way can this instruction be best accomplished: If we look for the ideal, out-patient service, so far as actual conduct of confinement is concerned, may well give place to systematic clinical instruction in properly equipped maternities. It would be quite as logical for a department of surgery to send its students to the houses of the poor to diagnosticate abscess, dislocation, fracture or beginning inflammation; a department of medicine might for the same reasons, send students to diagnosticate pneumonia, typhoid, and beginning tuberculosis, at the home of patients. It is alleged as the great reason for out-patient obstetric practice,

* See original article page 56.

that the student learns to overcome difficulties which can be met in no other way; but he is forming habits at this time, and these habits should be made where things are done in the best manner, and not in the worst. He should form his habits by practice under instruction in the maternity, and he will have, after graduation, ample time and opportunity to perfect or revise these habits in the first years of his own practice. With modern tendencies in charitable work and medical education, the time will come when out-patient medical service of all kinds will be largely reduced to the work of the social service department, and when the actual treatment of cases of all sorts will be conducted in the hospital. A further and great advantage of hospital treatment is the fact that an instructor can be always available at a hospital, whereas such are the uncertainties of confinement with an out-patient service, that a considerable number of confinements occur before an instructor can reach the patient.

So far as the work of the State Board goes, I believe Dr. Baldy's conception of the situation is eminently correct, that the first duty of the State is to its citizens, and that teaching interest in medicine must coöperate with the State Board to that end. The best service will not be rendered to parturient women until there is in the State a considerable number of competent obstetricians besides those that are found in the principal teaching centers. We endeavor to teach surgery to our students, and hope that but few will become surgeons. The list of The American College of Surgeons looks very large, but in comparison with the lists of the College of Surgeons of England it is not unduly large. It is true that surgery has grown enormously in America, but we have a large country and a large population, and obstetrics has not by any means obtained the same growth. The public needs competent obstetricians in all parts of the State. A certain number of men will qualify themselves to do obstetric surgery safely and successfully. These men will become attached to various hospitals throughout the State, in their maternity departments. The action of the State Board in causing the establishment of maternity wards in all hospitals will greatly aid the development of good obstetric service. These hospitals and their attending obstetricians will form centers of professional growth, and centers of efficient service for the population. While the smaller hospitals cannot be the centers of teaching for a large number of students because they have not the number of cases seen in the cities, yet these hospitals will render important service to the State in educating the local profession and giving relief to patients. The best interests of the population and of the profession, alike, so far as the development of good obstetric practice is concerned, will be served by the action of the State Board in this regard.

There are economic reasons for the renewed interest in obstetrics as a rational means of conserving the population. The waste of human life at present is so enormous that the economic value of human life has become greater. No method of conserving a popula-

tion can be found so efficient as the proper development of adequate obstetric service.

DR. GEORGE M. BOYD.—The question of the advance in the teaching of obstetrics is one of moment and interest. When we think of the progress that has been made since the days of the rudimentary training us older men received back in the 80's, theoretical and without practical instruction, we know that there has been a great gain in this branch of medicine. I am in accord with what Dr. Hirst has said. I feel, however, that we must create a standard, that we must aim as high as possible, and that until we can work in uniformity, until there exists in each State the same requirement, it will be impossible to make the progress we desire. I feel that in the State of Pennsylvania we are a step in advance of some of the others in first requiring a year of hospital practice and part of that time given to obstetric work. The difficulty encountered in the majority of schools teaching medicine is that the student is not under our direct control; he does not live within the walls of the hospital. The hospital year provides in a measure for this defect. While the obstetrical material may be limited in the hospital year the student is in the hospital and has a practical knowledge of the cases. To repeat I feel, that in teaching obstetrics the schools should aim at a standard as high as it can possibly be, and that it should be lived up to. Even in the small hospital there may be seen a variety of interesting cases. I endorse what Dr. Hirst has said of the importance of clinical work and the amount of time that should be given to that part of obstetric teaching. I feel, however, that the didactic course is important, for there is a large part of the teaching of obstetrics that cannot be carried out in the clinic. I have enjoyed the paper and believe that we cannot have a uniformity of teaching until the same requirements for the practice of medicine exist in all States.

DR. ALICE WELD TALLANT.—It is with great pleasure that we listen to any proposition for the improvement of obstetrical teaching in this country; it is certainly one of the places in which the greatest need exists, and anything that can be done in this direction in this State or in any other is for the welfare of the whole country. It is true as Dr. Hirst has said, that we in America are far from being able to congratulate ourselves upon the requirements in obstetrics. So far as the State of Pennsylvania is concerned we may, at least, congratulate ourselves that there is a minimum requirement, since so many States do not have even this; it is something to have the requirement of twelve cases. In regard to dividing the cases between the undergraduate years and the interne year, I do not understand that the minimum undergraduate requirement of six cases carries with it a stipulation that the colleges shall not give more than these cases. It is perfectly true that to see a large number of complicated cases is of great value, but it is very necessary to emphasize the value of actual contact with the patient. One may watch a forceps or a version case, but it is very different to do it oneself; in the same way, many of the cases

which the students see are a help in certain ways, but not the help that comes from the work which they have actually done for themselves. Dr. Davis takes exception to the out-patient practice. I feel, however, that the training connected with the out-patient practice of obstetrics, in which the students meet emergencies, accept conditions as they find them and bring success out of unfavorable surroundings, is the kind that will be of the greatest help to them when they go out as physicians into places in which the hospitals are not at hand; not only in the foreign field, but in our own country. It is very easy to practise obstetrics in well-appointed hospitals, but many of our students are going into the homes of patients and must make the best of what they find. In our work at the Woman's Medical College I always feel that the out-patient work is of the greatest value.

So far as the State requirements are concerned, practically all our students are already delivering twelve cases in their undergraduate course, but I do not feel that it can do any harm to have six more required after they graduate. We lay as much stress as possible on the practical side; all medical schools do at present. I think that the cases conducted during the college years in a certain way of more value than the same number of cases conducted after graduation, for the reason that in the colleges the cases are conducted according to certain teaching principles laid down in the school. Internes in hospitals do not get as much teaching as they should; the staff, with the best will in the world, may be unable to teach the internes who are in the hospitals, so that they are not given experience under the proper supervision. For that reason I feel that to increase the requirement in the medical school would be of the greatest value. The State has made a fine start in requiring the number of cases that it does, and I have no doubt that it intends to require more as the years go on, and the sooner it requires more, of course, the better. Another help in the improvement of obstetrics would be the establishment of teaching fellowships in colleges, such as we are offering at the Woman's Medical College this year, whereby students may obtain special instruction in obstetrics following their undergraduate training.

These are the chief points that have occurred to me in following the discussion thus far. I do feel that our State has made a good start, but I feel, too, that it needs to go ahead, farther, as I have no doubt it will. Any increase in the requirements of college training is to be welcomed in whatever way brought forth.

DR. JOHN E. JAMES.—I wish to go on record first of all by stating that I am in absolute accord with the statements which Dr. Hirst has made. I feel that Dr. Hirst has brought forth a subject exceedingly timely. The points Dr. Hirst mentions bespeak an ideal condition for obstetric teaching that must eventually give higher standards in the teaching of obstetrics in the different colleges and improve the practice of obstetrics among the general practitioners of medicine. It is the consensus of opinion among medical educators that emphasis should be placed upon the value

of practical training in the thorough equipment of the medical student. This being true, whether a student can obtain sufficient bedside instruction in the undergraduate year without the supplementary training in the recognized hospital depends upon the number of hours which the college curriculum gives the student and also upon the clinical material available for teaching purposes. The number of hours devoted to the clinical and didactic instruction in obstetrics is decidedly below that which it should be. I, therefore, feel that the law of the State of Pennsylvania in demanding the hospital year supplemental to undergraduate study is a most vitally essential educational adjunct. The greater amount of practical training we give our students the greater will be the reduction in mortality and morbidity—and I believe the morbidity rate is to be considered equally with the mortality—and we shall see a lessened amount of poor obstetrics among general practitioners. Many objections will be raised regarding the hospitals to which men shall go for this supplementary training. The men in charge of the so-called, maternity hospitals in many instances are not of sufficient caliber to give the supplemental training. Likewise many of the hospitals have not sufficient clinical material for instruction. I believe, however, that the hospitals can be brought up to the proper standard by the board of licensure or other board legally appointed. Under present conditions I feel that the position of the Pennsylvania Board of Licensure in demanding a hospital year is a most excellent one. I feel that they should go one step farther and designate by proper control the different hospitals to which the students should be sent for their supplementary teaching.

DR. J. M. BALDY.—There is nothing that would give me higher pleasure than to be able to attain the ideal and to attain it at once. My experience in the last five years of this work has been that when I have gone after the ideal I have lost the whole gist of that which I was after. Idealism is not attained in leaps and bounds, but by evolution. Now I am in hearty sympathy with all the essayist has had to say regarding what ought to be. The question is, can we get, and are we going to get something until we get the ideal. It must be borne in mind that the teacher in the school has one viewpoint, that the administrator in the State has another. The State should prod on the laggard, but should not set a pace beyond which all can reasonably go. The State is not legislating alone to educate the interne, but to secure the best medical care for the people of the State. The education of the interne, however, reacts upon the people of the State, although his education is a mere incident. I at first thought the solution of this whole matter was very simple, but many things are to be considered in order to accomplish results. I think the essayist himself has not thoroughly understood the Law of Pennsylvania. By it the Bureau of Licensure is not tied down as are all the other States by hard and fast acts of Assembly. There is an element of discretion allowing the Bureau to advance the standard as rapidly as in their judgment is advisable. If the time has come when the medical schools of the State have

performed that which the State requires, then the Board of Licensure will go another step and yet another. That which the State has been doing in the hospitals has been looked upon in two ways, and must not be confused. It is supplementing the work of the medical school. The requirement of the hospital is a minimum of six obstetric cases: so the Act says; a maximum is to be at the discretion of the Bureau of Licensure. The Bureau is ready to advance toward that maximum if the schools of the State are. The people of the State are entitled to a proper practice of obstetrics. We are well aware they are at present abominably served by some of the men on the hospital staffs. The interne often goes out of the school infinitely better prepared to give that service than many on the staffs of many of the hospitals. The State realizes that fully 50 per cent. of the doctors in the State are not fit to teach obstetrics. This requirement of six cases in hospitals is only a beginning and whether we shall succeed in our endeavors to standardize the hospital properly depends upon whether we shall have the backing of such a body as this; we need the backing of the best element of the profession. The work we are trying to do is not meant to take the place of the undergraduate school. If I am assured tonight by any of the teachers of medical schools that they are fully meeting the requirements of the six cases, within a few days we shall have under consideration the increase of the requirement to twelve and when the time is ripe, this will be increased to twenty. I do not mean that every school must follow; but, if five can do so, the others will have to, unless they can show us that it is impossible. It is up to the medical schools to say when the advance shall be made. The doctors in the State in the small communities need proper teaching. There should be installed in all hospitals a certain number of obstetric beds with competent men and then the community could be educated to go to those beds and not to the midwife. Dr. Davis struck the keynote. How are we to get better service to the State if we do not turn out better obstetricians, and how shall we train these men if they are not given opportunities after leaving the school. This was illustrated by an incident in my own town of Danville and is typical of the whole situation: A young man who had been graduated from the University of Pennsylvania Medical School, said to me, "Dr Baldy, what's the use of your Bureau requiring us to take all the laboratory and scientific work we have to take at the college, when we never have an opportunity to use this knowledge." As you give them opportunities they will develop themselves and will give the towns good obstetrics as well as good surgeons and they will be teachers themselves to the younger men who come to them as internes. We cannot accomplish that in a day or in a year. We are endeavoring to lay so solid a foundation that when the politicians put us out we will have left a heritage upon which the profession can build forever afterward.

DR. JAMES WRIGHT MARKOE, N. Y.—This subject interests me greatly. Twenty-six years ago the work of the Lying-In Hospital in the City of New York started from a peculiar circumstance.

Connected as I was with the College of Physicians and Surgeons as house surgeon of the Sloane Maternity Hospital, I found on going to Boston that they had an out-patient department where they taught the students practical obstetrics and I came back very enthusiastic over the idea and presented it to the College of Physicians and Surgeons, but they said the proposition could not be carried out. I called attention to the same service done here in Philadelphia, and still they insisted upon it that it was not practicable, so I started this thing then with the idea of giving outdoor education in obstetrics. Twenty-six years have gone by. Through the indoor and outdoor services of that hospital have passed 100,000 cases; we have educated some six or seven thousand students although we are not connected in any way with any institution. Students come to us—undergraduates and graduates from all colleges and from all States in the United States. They come because we give them something they cannot get anywhere else. This may sound egotistical, but it is not, for we have the most abundant clinical material in New York of any city as it is the largest city of the United States, and therefore must have more clinical material. The question comes up in Pennsylvania, of how to educate the students? My one thought all these years has been for the medical men, alone in the country who are without aid and without consultants within easy reach. I want to give such men a knowledge of obstetrics which will not make them capable of doing a hysterectomy as perfectly as Dr. Hirst or Dr. Davis will do it, but will make them competent to take care of any ordinary cases so that their mortality will be no higher than the general run of the best maternity hospitals. I believe that it can be done by teaching these men at the bedside. I do not agree with Dr. Davis that the out-patient department is of no value. I think the very fact that a man has to take care of a woman where there is nothing at hand but water—and very often that is dirty water—is a very great education. We in the Lying-In Hospital have done this under the strict supervision of as well-educated instructors as we can get. By our plan a man goes to a case and is followed in an hour by an instructor. He is visited every two hours by that instructor, and if he makes any mistakes they are corrected by the instructor, and each student sees from twenty to thirty cases in that way. The first part of their service is given in the hospital where they see a large number of complicated cases from which they have a good idea of their duties in the out-patient department. I have had letters from ex-students saying they would not take a thousand dollars for the experience gained in the tenement houses. We have reduced the mortality in these cases managed by our students considerably below the mortality of the physicians, taking all physicians in the City of New York. We have a great deal better mortality than the run of doctors in the City of New York, notwithstanding that these cases are taken care of by students. When I look back over those twenty-six years and think of the very few teaching institutions there were then in the United States and think of the ob-

stetricians we have sent throughout the towns and cities of this country, I feel proud of the progress made. I do not belittle the fact that we must seek much greater progress but if the State of Pennsylvania, or any other State, will guarantee that their students graduate with a knowledge of what the fundamental principle of obstetrics should be by practical bedside instruction indoor and outdoor it will have accomplished a wonderful amount of work in the right direction.

DR. ALEXANDER MARCY, JR.—Personally I have been very much interested in listening to the papers read and to the discussion following. The sentiment has been quite in keeping with our idea in New Jersey as to what should be required before a license to practise medicine shall be granted. I am free to confess that Pennsylvania at the present time is just a little in advance of New Jersey along this particular line. We in New Jersey have heretofore been leaders in medical licensure and in our requirements, and I think our law at present is second to none in the country, excepting in some particulars. I think Pennsylvania has rather "put it over on us" in this matter of hospital standardization and requirements for the teaching of obstetrics. This year, however, after July 1, we do require in New Jersey a year of internship before a person will be allowed to come before the Board for examination. We have not, however, stipulated the number of hours he should take in practical obstetrics or the number of cases he shall attend before he comes before the Board. From what I have heard to-night I think we shall have to amend our law, and I think we shall make the number of cases twenty-five.

DR. ADOLPH KOENIG, of the State Bureau of Medical Education and Licensure, Pittsburgh: I did not intend to make any remarks here to-night, but came simply to listen and to gain some ideas. I do feel, however, that I should commend the statements which Dr. Davis has made here to-night; they appeal to me as being good common sense and in keeping with the situation as it exists at the present time. It is an easy matter to say that we should have things idealistic. I am thoroughly in accord with everything that Dr. Baldy has said. As a Bureau, we are absolutely a unit on these things, believing that they are evolutionary. Such an example of inefficiency on the part of an obstetrician as was mentioned by Dr. Hirst is an arraignment against the college graduating such men.

I regret that the Bureau of Medical Education and Licensure has no way of sizing up the personal equation of a candidate or of investigating his ingenuity. That is something which should be done by the college, and I believe is now being done. Twenty to thirty years ago or less the intellectual status of a candidate for the study of medicine was never inquired into by the colleges.

I am thoroughly in accord with the requirements regarding obstetrical experience in the hospitals. The Bureau is standardizing them and investigating their ability to give the opportunity for the acquisition of such experience. An approved hospital stands

between the school and the general practitioner. If the college thinks the present number of required cases right the Bureau I am sure will not object. These hospitals carry the graduate to the time when he will be upon his own responsibility—even though he may not have the highly qualified teacher to supervise, he still has some one to fall back upon when he gets into trouble. That is a condition very much better than the old situation.

I am very glad to be here and to have heard what has been said, and I am heartily in accord with most of the sentiments expressed, especially so with what Dr. Baldy has said.

DR. RICHARD C. NORRIS.—I think this meeting has been well worth while; it has clarified the atmosphere, and has given us all, clearer ideas of what this law established by the State means. Every one will agree, that the higher the college raises its standard in obstetric teaching the better. Unless internes are properly trained in their early experience in obstetrics, they cannot expect to be masters in the art and science of that branch. The orthopedic man, the eye man, the general surgeon, the internist, the laboratory—all clamor for the same advance in their departments while the roster is crowded beyond the student's endurance, and there must come a time when medical students, to be better educated along all lines, will have to use the hospitals for a final year of instruction and experience. The State says to the obstetric-teaching institution, raise your standards as high and rapidly as you will, and we will meet them. They are doing their best now, and they will do better. When we come to study the relationship of the State law as to the year's internship in the hospital, the paramount question at issue to my mind is the advantage to the community. The matter must be viewed in its relation to the teaching institution, to the student, to the community and to the doctor. As Dr. Baldy has said the matter is in process of evolution, and no State, not even Pennsylvania, could at once make a law that would meet all these conditions and satisfy every one concerned. Dr. Baldy has also brought out the essential point of the benefit not only to the student, but to the doctor. You will remember that in the earlier days the great surgical operations came to Agnew and Gross who had established teaching centers and developed their art. Those conditions no longer prevail. Hospitals now exist in each community, and have created able surgeons. Where there is a hospital there is a need for a surgeon; when there is a maternity there is need for an obstetrician, and that need will create the supply. So I can see that hospitals compelled by the State to have obstetrical departments, will find the morale, the skill and the experience of their obstetrical staffs increasing rapidly just as surgery has been developed in those hospitals in the recent past. There is no question to my mind that this movement is one to uplift the educational standards of our State in regard to the student and the doctor. If obstetric surgery is developed to its highest point it must be done in our hospitals. Let a man leave his school having seen a large number of Cesarean sections, unless he has had personal,

close range experience, such as he gets in the hospital working with the surgeon, he is not well trained in that particular operation. He must be trained in surgery to meet the demands of modern obstetrics since advances in the latter have been largely surgical. As I have heard the paper and discussion this evening, I have realized more fully that Pennsylvania has put a powerful lever under medical education and especially under obstetrical education, and that as time goes by we shall see more and more the benefits resulting to the profession and to the community and I believe that the objections raised by Dr. Davis to the out-patient department will disappear. In the past the woman had to be treated in her home; the student had to be taught the care of the woman in her home. While the public is being educated to the advantages of hospital obstetrics there will be less and less demand for out-patient obstetric work. However, until every woman seeks hospital service, out-patient training for the medical student cannot cease to have its value. Bearing upon this subject, only to-day I had the Chief Resident Physician at the recently created Maternity Department of the Methodist Hospital look over our records. The new State law brought this department into existence. Since April 19, 1915, we have had 127 confinement cases; five high forceps; seven low forceps; two vaginal Cesarean sections; four abdominal Cesarean sections; three podalic versions; seven induced labors; two craniotomies; one cleidotomy; one ruptured uterus; twelve cases of eclampsia. That one, hitherto, general hospital should have this amount of obstetric surgery to teach five men, shows how valuable this new law is to hospital internes and to obstetrics. Had these cases been in the University Hospital or other college hospitals more students would have seen them, but the knowledge acquired by these five men has been of greater value to them since they actually helped in the work at close range. It is, however, out in the country, in the small community, that this kind of emergency obstetric work will drift more and more into the hospitals equipped for maternity work. I believe we should uphold the hands of our State Board; should ask the colleges to raise their standards higher and higher, and at the same time the State Board should see to it that the hospitals throughout the State are just as efficient in their obstetric departments as in their laboratory and research work, for which the State has set a standard.

DR. SENECA EGBERT.—What I may say is from the standpoint of the Dean who has to keep in touch with the schedules of the various students. I listened to Dr. Hirst's paper with a great deal of pleasure. While the six (or twelve) cases are the minimum number required, I do not believe there are many schools in the State in which the number of cases participated in does not much exceed this amount. The opportunities at the Lying-In Charity Hospital in this city are by no means small, and when we consider the work given here to the medical student in addition to that of the various teaching institutions, we must acknowledge that the number of obstetric cases seen and cared for by the average student

is considerably above that required by the State law. From the standpoint of the school it would seem that so long as it is under the regulations imposed by the various governing bodies, such as the Council on Medical Education which have no legal control but much moral influence, we can do little else than we are doing. At the recent meeting in Chicago of the Council on Medical Education, one of the speakers proposed that some of the present teaching hours be cut out to give the students more time for reading and recreation. From the fact that a medical student has over a thousand hours of scheduled work a year you can get an idea of what he is supposed to do. He must also do a lot of work at night. It seems to me there is chance for possible improvement in rearranging our schedule that obstetrics may be taught in a compact way for a certain part of the senior year. Regarding hospitals, why should there not be established throughout the State certain obstetric hospitals to which men from other hospitals might go for a certain portion of the hospital year and for which the time could be counted as part of that year?

DR. CHARLES P. NOBLE.—We all should feel reassured by what we have heard to-night. Thirty-two years ago I entered the practice of medicine as a student and teacher of obstetrics. For five years I was connected with the old Lying-In Charity. I think it is true that it fell to my lot—not through any merit of my own—to do the first clinical teaching of modern obstetrics in the United States. Just by accident I attended the first course of demonstration of modern obstetrics ever given in the United States in 1883. My teacher was Dr. Neal of Baltimore. Coming to Philadelphia a youth I very promptly became the first assistant at the Lying-In Charity and so it fell to me to give that first course. That was in 1884 or '85. Now the contrast between the obstetrics taught in the United States to-day and that of that time is very gratifying. In spite of the fact that there is very much that should be modified, we are to be congratulated that in one generation so much has been gained. I should also like to congratulate the Philadelphia Obstetrical Society upon the way it has trained its members in speaking. I have not had the pleasure of hearing many of these men speak for a number of years and I think that they have all greatly improved in my absence. I am quite in sympathy with the purport of most that has been said to-night. Certainly with what Dr. Hirst said I am in sympathy, because it is the wish to have here in the United States the ideal which they have all over Europe, except perhaps in England. On the other hand, I believe that Dr. Baldy is quite right in that all through the country these hospitals which have been small comparatively have been the means of training surgeons competent to deal with all kinds of work. It will also be true that in the departments in the smaller hospitals obstetrics will be much better taught and practised throughout the community.

DR. CHARLES EDWARD ZIEGLER, of Pittsburgh.—I am in entire agreement with the position taken by Dr. Hirst—that the student

should receive his practical training in obstetrics before graduation and not during his year of interne service in such hospital as he may happen to enter. Certainly practical instruction in obstetrics should be regarded as an indispensable part of the student's undergraduate medical education. The teaching of the fundamentals in any branch of clinical medicine is a serious business and to take it out of the hands of trained, responsible teachers and turn it over to poorly or indifferently trained practitioners—too busy and too little concerned to give the matter more than passing consideration—is in my opinion a very grave mistake. Successful and effective teaching is developed and is to be found only in institutions where teaching is seriously, systematically and deliberately done under careful supervision and control. It is generally conceded that the standards in both the teaching and practice of obstetrics in this country are very low—the lowest in fact of all the clinical branches of medicine. Improvement must begin with the medical schools which alone may be depended upon to set the standards. To transfer even a part of this work to the general hospitals throughout the state, over which the medical schools have no supervision and no control, will in my opinion accomplish two things: First, it will prevent the fullest development of great obstetric teaching institutions so much needed in this country and second, it will lower rather than elevate the standards not only of the teaching but also of the practice of obstetrics.

I am in full sympathy with the work of standardization of the hospitals of the state which is now being carried on so efficiently under Dr. Baldy. In my opinion, however, it should be done, not for the purpose of providing better clinical teaching for students during their fifth or hospital year, but largely, if not solely, for the purpose of securing better medical work on the part of both the attending and interne staffs of the hospitals. I am inclined to the belief, moreover, that on the whole better results would be secured by adding a fifth year to the undergraduate instruction in the medical schools, to be spent in the hospitals which are an organic part of or under the control of the medical schools. During this clinical year, three months should be spent in the obstetric hospital and dispensary services which are a part of the department of obstetrics of the school of medicine. With rising standards in medical education and corresponding reduction each year in the number of graduates, it will be increasingly difficult for the hospitals, whether good or otherwise, to secure internes under the plan so long in existence. At present, recent graduates in medicine enter hospitals very largely for the clinical experience which they hope to receive and the hospitals accept them very largely because of the free service which they are expected to render. The result is that the internes do not receive the training which they should and the hospitals receive poor service. The time is fast approaching when to secure and hold internes, hospitals will have to pay something for their services and this they can well afford to do after the internes have spent a year of undergraduate clinical work under

competent teachers and in favorable surroundings. Such internes would be of real service to the hospitals and as a result would be given wider opportunities for experience, to say nothing of the influence which they would have in elevating the standards of practice in the hospitals which they serve.

Under present conditions of four years of undergraduate instruction in this State, the student should spend several weeks during his fourth year in a well-equipped and properly conducted maternity hospital and dispensary. Such institutions should be teaching and research institutions in the fullest and broadest sense of the terms, with a large amount of obstetric material freely and constantly available for the purpose. The teaching staff and there should be no other, should consist of full-time workers only, who should be paid salaries sufficiently large to make them independent of all other work. This condition of affairs is essential if the teaching is to be maintained at its maximum efficiency and the obstetric material fully utilized as it presents itself. When we speak of clinical teaching in obstetrics, we do not refer alone to formal clinical lectures given in an amphitheater, before a score or a hundred students, so many hours a week. On such occasions only cases available at the time can be used so that but a very small part of the clinical teaching can be given in this way, even though well given and most valuable when it occurs. Since labors occur during all hours, both day and night, at irregular, uncertain and unexpected times, obstetric teaching from the clinical side must necessarily be a continuous performance irrespective of eating, sleeping, recreation and study. Each labor case must be utilized to the fullest to teach and to learn all that it offers in order that the student may have the largest opportunity possible during the limited period assigned to him for his practical work; and also because by using each and every case as a teaching case, the complications and unusual things are thereby the most certainly discovered and utilized to the great advantage of both teacher and student, to say nothing of the incalculable benefit to the patient. I am well aware that competent obstetricians cannot be trained by undergraduate instruction alone. On the other hand, much more can and should be done for undergraduate students in obstetrics than has as yet been done in this country. I am likewise aware that the four years of undergraduate instruction in medical schools is already so fully occupied that not much more can be diverted from other subjects for obstetrics. With a system of intensive teaching such as I have described, much more can be given the student, however, than he now receives. During the time of his service, the student should be given ample opportunity for the examination of pregnant women including vaginal examinations, abdominal palpation, auscultation and pelvimetry. He should follow case after case through labor from beginning to end, always under the most careful supervision and instruction of trained teachers. He should not only be allowed to observe deliveries, but should conduct them as well under supervision and instruction. Opportunity should be given also for

repeated vaginal examinations on parturient women—each case of labor being used to the fullest extent for teaching and practice—with due regard, however, for the strictest asepsis. The student should follow most carefully the puerperal convalescence of every patient in the hospital at the time of his service, especially those whose deliveries he has witnessed or conducted. The care of the babies should form an important part of the hospital instruction. Bathing, care of the eyes, the giving of enemata, the doing of resections or circumcisions, inspection of the stools and the modification of cows' milk for infant feeding should all come in for consideration in the most practical manner. At the close of his hospital service the student should enter the dispensary service, where under close supervision he should be required to care for pregnant, parturient and puerperal women, following the technic, as far as may be practicable, which he has learned in the hospital.

In our work at the Magee Hospital, three students are on duty at a time. Each student gives the anesthetics for four cases during the close of the second stage; as second assistant, he counts the fetal heart sounds, observes the character, duration and frequency of the pains and controls the fundus and uterine contractions during and following the third stage of labor for four cases; and as senior assistant, he assists with the ninth case and finally delivers under supervision and instruction, the tenth, eleventh and twelfth cases in his service. At the close of his service in the hospital, the student is sent into the out-patient service where he conducts four more cases under supervision and instruction. He is thus present at a minimum of sixteen cases of labor, seven of which he has personally conducted under instruction and supervision. If his work thus far has been satisfactory he is then permitted to conduct alone and upon his own responsibility as many additional cases as he has the time and inclination for.

This briefly is the method followed in teaching practical obstetrics to undergraduate students at the University of Pittsburgh. During the coming year we shall have not less than 1500 cases of labor available for teaching purposes. If sufficient time were available we could give to each of the twenty-five members of the present fourth year class the opportunity to conduct personally, under supervision and instruction, twenty-five cases of labor. And this is what we hope, sooner or later, to accomplish for our students before graduation.

DR. HIRST, closing.—I have two things to say: I shall go from this meeting with an even greater admiration for the work done by my old friend, Dr. Baldy, than before I came to it. I fear I do not deserve Dr. Noble's congratulations, for I seem not to have made myself clear. The one thing which I wanted to make clear was the defect in our laws, in not requiring an adequate amount of time to be given to the study of clinical obstetrics on the roster. That is what I would like our legislators to take into account, in addition to cases attended.

DR. NORMAN L. KNIPE and DR. JOHN DONNELLY read a paper on

THE TREATMENT OF ECLAMPSIA AND ITS RESULTS.*

DISCUSSION.

DR. JAMES WRIGHT MARKOE.—Dr. Knipe's paper is most interesting and it makes me blush to think of the results he has obtained when my results have been so bad. In going over my records in the Sloane Maternity Hospital I found the history of a fatal case of eclampsia treated in June, 1888, when I was an interne there. The patient was a girl of seventeen and was moribund when brought into the hospital. She was given 10 minims of Magendie's solution which dose was repeated; I sat up all night and gave it to her, 55 minims in all. Her heart action grew weak and we then gave her some whiskey. Her temperature rose to 108.2 and we for this gave her 60 grains of antipyrin, but her temperature did not come down, so we gave her 60 grains more. She got a little more morphine and a good deal of chloroform and I do not know what other drugs, I think possibly some croton oil. I sent for the attending obstetrician, Dr. Partridge, and he came and did a Cesarean section, obtaining a macerated fetus; the woman then died. That was twenty-eight years ago, and that kind of treatment is sometimes given, barring the antipyrin, in these present days. Now, what was the etiology of that case? There is no doubt about it now—it was a true toxemia of pregnancy—a condition which we still know little about. Some of you may remember the studies of these cases made by our Dr. Welch, who was a most careful observer of this condition. He suggested that there might be some changes caused in the blood-vessel walls by the toxins weakening the walls and allowing the migration of the blood into the tissues. Be that as it may, these are cases that are occurring in all services, I believe in localities under certain atmospheric conditions. Last year I had the United States weather reports brought to me and every day, every toxemia case or of threatened eclampsia was written on the back of the weather report, and I propose to find some man—and I believe there is such a man who will interpret weather conditions—who can help me trace any possible connection between atmospheric conditions and eclampsia. We have those cases of eclampsia which no treatment will help. We had one this week; my first assistant treated her with the morphine treatment in the very latest and approved method, but she died. I cannot show any such statistics as Dr. Knipe has shown to-night. In 100,000 admissions, we had in these cases a mortality of 24.3 per cent. That, however, is not a fair statement because in the first 250 cases we had a mortality of thirty plus. In eclampsia some cases will get well, no matter what you do; others, no treatment will touch. I have not made up my mind what is the best treatment. However, in the case of every woman with eclampsia coming into the hospital

* See original paper page 63.

whether or not she has had convulsions, I put into her stomach as large a dose of castor oil as I can with the idea of getting it through the bowel if possible. Whether you give morphine or not I am satisfied that chloroform and chloral do harm. Whether morphine has the effect of reducing the convulsive action and thereby curing the disease, or whether it has an effect upon elimination by the kidneys and other organs is a question that I cannot solve because I have not had enough cases to convince me. Last week I had two eclampsia cases; one died immediately and the other got well, both on the morphine treatment. We are now using this treatment to see what can be done in a certain series of cases.

I think the paper is most interesting and that the statistics and results are splendid.

DR. EDWARD P. DAVIS.—Like Dr. Markoe, I have tried the various methods of treating eclampsia, and agree with him in recognizing it as an expression of toxemia. So diverse and complex is the toxemic process that statistics on this subject are especially misleading. Toxemia includes the pernicious nausea of early pregnancy, and terminates in the fulminant process which may or may not be attended by convulsions. In truth, one may for some time have very favorable results in the treatment of this condition, provided one is moderate in whatever he does, but then will come a series of cases where the toxemic process is especially severe, and these patients will die, no matter what is done for them.

In the present stage of our knowledge, unquestionably the best results are obtained by treating in the most vigorous and efficient manner, the toxemic process. No greater mistake can be made than to immediately deliver, by some obstetrical operation, every patient coming under the observation of an obstetrician, and suffering from the toxemia of pregnancy. The number of convulsions is not a decided element in the case, nor is blood pressure, for some cases with high pressure recover, and others with low pressure die. Nor does the occurrence of labor end the danger, for some of the most rapidly fatal cases develop after the birth of the child.

In treatment, one will do well to avoid depressing agencies of every sort, and to use anesthetics as little as possible. Bleeding followed by intravenous saline transfusion, lavage of the stomach with the introduction of calomel and soda, copious irrigation of the bowels, and the securing of as much fresh air as possible for the patient, are of great practical value. Should labor develop, it should be assisted, but not forced. When there is no tendency to labor, the uterus should remain undisturbed. In very rare cases, with mother and child in fairly good condition, an undilated and undilatable cervix and birth canal, is delivery by section advisable.

At least two weeks must elapse after the delivery of a patient suffering from fulminant toxemia before her recovery is assured. Gangrenous pneumonia and acute mania may result fatally.

DR. BARTON COOKE HIRST.—There is a curious fashion at present to decry the advantages of sweating in eclampsia. This, I think, is a mistake. The objection is based upon the theory that the

toxins of eclampsia are of a kind that cannot be well eliminated and are concentrated if the patient is sweated. But this theory does not take into account the fact that all cases of eclampsia are also cases of acute parenchymatous nephritis in which the kidneys cease to act. The urine is very scanty and solid with albumin. In such a case no general physician would omit elimination by sweating. I have found that sweating is an extremely efficient adjuvant of treatment and that it is a mistake to overlook it.

DR. JAMES.—I have little to add, simply to say that in threatened eclampsia, the preeclamptic stage, the absolutely conservative treatment to my mind is the ideal; namely, to leave the uterus absolutely alone. The treatment of the case of true eclampsia I think involves a study of the individual case regarding the time of delivery. In a general way I would favor early emptying of the uterus selecting the most conservative procedure. I agree with Dr. Hirst upon the question of sweating. We should get rid of the so-called toxic state. With the sweating we may associate gastric lavage and washing out of the intestines. I would also use morphia, which has quite a potent value. Chloroform I believe is contraindicated.

DR. JOHN C. HIRST.—If we advise immediate and forcible delivery in eclampsia much work will be done in private houses and under unsatisfactory conditions, thereby giving an added danger of surgical shock and septic infection. I would regard, therefore, the dictum of routine forcible delivery in private houses a very real danger. The number of convulsions is not, I think, an important element in the mortality. One patient in the University Hospital had been taken with convulsions in her own home. She had them rather actively for twelve hours. At the end of this time she was taken to the hospital when she had 199 others and recovered. She thus had a total of over 250 convulsions, and in spite of this, the case terminated favorably.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting, February 8, 1916.

The President, DOUGAL BISSELL, M. D., in the Chair.

DR. GEO. W. KOSMAK reported a case of

GANGRENE OF THE SIGMOID AFTER NORMAL LABOR.

The patient was a para-ii, whose first pregnancy ended as a miscarriage at the fourth month. She had applied for care during her confinement to the Outdoor Department of the Lying-In Hospital

and developed false labor pains on December 20, 1915. The cervix was one finger dilated and thick, the head not engaged, fetal heart good, temperature and pulse normal. The patient was seen again about nine hours later when an examination showed the head engaged, membranes ruptured and cervix three fingers dilated. The labor progressed without incident and at 4.40 P. M. dilatation was complete, a spontaneous labor taking place at 7.15 P. M. A second-degree lateral tear was repaired with three chromic- and one silkworm-gut sutures. After delivery the temperature and pulse were normal and the patient was left by the attendant in good condition. When visited the following morning her condition was the same but when visited again at 5 P. M. the temperature was 102, pulse 160, abdomen tympanitic with marked rigidity on the left side. The family said that this condition of collapse came on during the afternoon without warning. The patient was immediately transferred to the hospital and arrived in a condition of pronounced collapse. The pulse was faint and irregular, the abdomen somewhat distended but not tympanitic and the patient was passing watery movements involuntarily. In view of the extreme collapse she was stimulated and no further treatment attempted. Vaginal examination showed the uterus well contracted, no tears in the cervix or vaginal vault and lochia of normal appearance. The patient complained of slight abdominal pain. An examination the next morning showed the general condition improved and the distention not increased. An exploratory laparotomy was done on the afternoon of December 21 by Dr. Asa B. Davis. Upon opening the abdominal cavity in the median line a thin straw-colored fluid with slight odor was discharged. The small intestines were slightly distended and examination of the descending colon showed a condition of advanced gangrene extending from the brim of the pelvis to the straight portion, about 14 inches in length. No evidences of perforation were found. The uterus, tubes and ovaries were apparently normal. A moderate amount of thin purulent fluid was present in the lower abdomen and in view of the patient's poor condition nothing further could be done except to insert gauze and rubber tube drains in either flank and through the culdesac. The patient failed to rally from her collapse and died about two hours after operation. An examination through the abdominal wound confirmed the operative findings. A careful inspection of the mesentery failed to show any evidence of thrombosis. The gall-bladder, pancreas, spleen and liver seemed to be normal as far as palpatory evidences were concerned. The sigmoid could readily be pulled down into the pelvis and a possible explanation of the gangrene of the descending colon in this case is that it was due to pressure by the fetal head in coming through the brim resulting in a bruising of the tissues and cutting off the blood supply. A careful search of the coils of small intestine showed merely a few patches of lymph but no evidence of perforation or general peritonitis. The case is of interest, showing the possibility of such unforeseen complications during labor and the difficulty of making

an early diagnosis. The collapse with rise of temperature pointed to a possible perforation of one of the hollow viscera and even if an exploratory laparotomy had been done earlier it would not have been possible to have afforded the patient any relief.

DISCUSSION.

DR. ROBERT T. FRANK said: "I was not here at the beginning of the reading of the report but in my experience the difficulties are more often seen before rather than after labor.

"I suppose the Society remembers a case reported a number of years ago by Dr. Brettauer, which I recall very vividly, where the patient was brought into Mount Sinai Hospital about eight months pregnant, I think, with symptoms of intestinal obstruction. For a number of hours she refused operation, but finally she was persuaded to allow herself to be delivered and delivery was induced very promptly. She was a multipara, the child was small, and immediately after delivery a volvulus was found. The patient was in an extremely bad condition and the only method that could be applied was the quick one of eventrating the bowel. She finally recovered after a stormy illness.

"Several days ago I saw a patient who was three weeks before her term. She had had pyelitis early in her pregnancy and again had developed another attack of pyelitis, this time on the left side. At the same time she had intractable vomiting, for which I could find no definite cause, and she, furthermore, passed very little, if any, flatus. Enemata were practically ineffectual. In consequence of this mixed feature I was very much in doubt whether or not I was confronted with an intestinal obstruction as the indications for delivery were rather clear. I induced labor and during the twenty-four hours before delivery this vomiting kept up incessantly. Her urine was full of indican and full of acetone, but as soon as the fetus had been delivered there was a free discharge of gas per rectum and the vomiting had stopped. Three days have now passed. Whether there was some slight obstruction due to the head pressing on some part of the intestinal tract, or whether the obstruction was secondary to the pyelitis, plus a little toxemia, I am unable to say. At all events, it is quite clear that we are occasionally confronted with symptoms, particularly during the latter part of pregnancy, which are hard to distinguish and which really force us to induce labor in order to distinguish."

DR. FRANKLIN A. DORMAN presented a

REPORT OF A CASE OF FIBROMA OF CERVIX OBSTRUCTING LABOR. CESAREAN SECTION, WITH HYSTERECTOMY.

Patient, M. R., negress, single, para-i, twenty-eight years old. Menses began at thirteen, regular every twenty-eight days, moderate flow, five days' duration, occasional pain, of late flow somewhat profuse. Last menses April 15, 1915. Labor pains began January 20 in the afternoon. Entered the hospital on the following day. The pains were irregular, far apart and of poor quality. Late in the afternoon of

January 22 the cervix was dilated one and one-half fingers, the pains were occurring once every fifteen minutes. At 5.30 P.M. a No. 1 bag was inserted. This increased the frequency of pains to ten-minute intervals. Four hours later the bag came through and a No. 3 bag was introduced. As there was no further progress after the expulsion of this bag, the case was seen by me on the forenoon of January 23. Patient was in good condition and although the membranes had ruptured twenty-four hours before, the fetal heart was good. The pelvic measurements were spines 24, crests 26, obliques 21, external conjugate 20, diagonal conjugate 10.5, true conjugate 9. The cervix now admitted four fingers but was thick. The head was high. A fibroid the size of a golf ball could be felt in the anterior wall near the fundus. A Cesarean section was performed and a seven pound infant delivered. The uterus showed the presence of four fibroids of varying sizes. One small one projected into the lumen of the uterus, another in the posterior wall of the cervix and was evidently the cause of the dystocia. Because of the presence of the fibroids and the previous long dry labor and instrumentation the uterus was removed by supravaginal hysterectomy. The specimen shows a fibroid the size of an olive in the cervical segment. The fibroids were undoubtedly the cause of poor uterine muscular action, and the cervical fibroid plus the pelvic flattening caused the obstruction.

DISCUSSION.

DR. AUSTIN FLINT, JR.: "Some years ago I had occasion to do a Cesarean section, while attached to the Staff of the Lying-In Hospital, for fibroid of the cervix and the woman didn't get well. I had occasion, at that time, to look up the statistics, which were not so voluminous as they are now, and I was very strongly under the impression that it was much better, so far as the prognosis was concerned, to do a hysterectomy following the operation of Cesarean section for fibroids, than it was to sew up the uterus and preserve it. I do not remember the figures now because it is a good many years ago, but I was wondering whether in the discussion of this subject, if there be any further discussion, it is the general knowledge, the general impression, that it is better to do a hysterectomy following Cesarean for fibroids rather than to try to do the more conservative operation.

DR. EDWIN B. CRAGIN: "I think that we could even go a step farther than Dr. Flint seemed to go. I believe, from my experience, that it is safer to do a hysterectomy after Cesarean section if there are many fibroids in the uterus rather than to run the risk of further trouble, so if I have a case with a number of large fibroids in the uterus and have to do a Cesarean, I prefer to take the uterus out.

By DR. AUSTIN FLINT, JR.: "I mean the question of immediate prognosis; that it is better for the woman."

By DR. EDWIN B. CRAGIN: "During the puerperium?"

By DR. AUSTIN FLINT, JR.: "Yes."

By DR. EDWIN B. CRAGIN: "That is as I understand it."

DR. BROOKS WELLS wished to put on record a case illustrating a danger of leaving a uterus containing fibroids after Cesarean

section. The patient was a multipara of forty-four, who had borne two children; the first died at birth, the second was born after a normal labor and is now living. For several years the patient has had a fibroid in the posterior wall of the uterus which caused no menstrual disturbance or discomfort. Was asked to see her by Dr. Guion, of New Rochelle, when she was nearly at term. We found a fibroid nearly the size of a clenched fist obstructing the pelvis and, as this could not be displaced, decided to do a section at the beginning of labor. To this the patient assented, but would not consent to a hysterectomy, though the risk of leaving the fibroid was explained. The skin of her entire body was covered, as it had been in each of her previous pregnancies, with flat purplish red papules of lichen, with many vesicles and some pustules, crusts, and numerous scratch marks. There was intense and constant itching. This rash had been treated by two prominent dermatologists with no apparent benefit, and as in former pregnancies did not disappear until the end of the puerperium. Three hours after the beginning of labor Dr. Wells with Dr. Guion's assistance did the section at the New Rochelle Hospital, delivering a living child.

On admission to the hospital the temperature was 100 and pulse 120. The next day the temperature reached 101.2, with a pulse of 112. On the fourth day the temperature was normal, with a pulse of 88. On the seventh day it rose to 102.6, with pulse of 120, and until the fourteenth day ranged between 99 and 105.6, with a pulse of from 96 to 128, the pulse being of good quality and only 108 at the time of the highest temperature. During this week she had five chills. On the sixteenth day the temperature reached normal with a pulse of 72. The abdominal wound healed without suppuration, and there was no evidence of any trouble about the uterine wound. There was no abdominal tenderness or distention at any time. The lochia were normal. Blood culture was negative. On the eighth day the white cells were 18,000, with a differential polynuclear of 84 per cent. The urine remained normal.

The patient did not feel badly, except that she was bothered by the severe itching and complained of general aching during the periods of high temperature.

Was the patient's condition caused by a toxemia by absorption from the fibroid, or from the skin condition, or from a surgical infection?

We felt at the time that the high temperature was due to absorption of toxic material from the fibroid.

At the present time the fibroid can be palpated but is insignificant.

DR. HENRY C. COE: "I was reminded of a patient who attended the Polyclinic about twenty-five years ago. She came regularly for a year or two and was a useful example to the students because she had a small nodule in the lower segment, anteriorly, about the size of an English walnut, which could be easily felt. I lost sight of her for three or four years. When I was asked to see her again she was eight months pregnant and the tumor had increased to the size of a baseball. Although this was in the preaseptic days a Cesarean section was performed with a successful result. I did not venture

to do a supravaginal amputation on account of the high mortality which then attended this operation. Two years later the patient was admitted to my service at the General Memorial Hospital suffering from double pyonephrosis and general septic infection, which resulted fatally—a striking commentary on one of the possible dangers of impacted fibroids; the tumor had doubled in size and compressed both ureters.”

DR. FRANK A. DORMAN: “I had two motives in doing a hysterectomy in this case. First, I had the same feeling voiced by Dr. Flint and Dr. Cragin, that a fibroid or several fibroids are a dangerous element in an involuting uterus, particularly after Cesarean section, and, secondly, I felt that it was a distinct menace to the woman to leave the uterus in a case which had been examined in one hospital and then sent to another, being in labor two days while dilating bags and various manipulations were employed. For these reasons I did the hysterectomy.”

DR. E. H. ELY read a paper on

ACIDOSIS IN PREGNANCY, WITH REPORT OF A CASE TREATED BY
TRANSFUSION.*

DR. EDWARD LINDEMANN spoke by invitation as a guest of the Society and after describing the technic of blood transfusion developed by him, continued as follows: “I think that the presentation of this case is somewhat an illustration of some of the things that might be done with such a method of procedure.

“After developing this system of transfusion my next interest was centered in determining the relative compatibility of blood for patients. In the first eighteen cases that I had transfused no blood tests were made. There was not a single case of incompatibility or hemolysis, and one naturally with an experience of eighteen cases, would suppose that blood tests were superfluous, unnecessary and meaningless. I was simply very fortunate. The subsequent cases, however, were not quite so fortunate. Some cases of incompatibility had occurred, so I took the position that I would refuse, except under the most urgent circumstances, to transfuse without first having preliminary blood tests. In making these preliminary blood tests I found that my percentage of reactions in terms of chills and fever, was approximately 33 per cent. There was a number of cases free from chills and fever and yet the same system of transfusion was used. The question was, could there be anything in the system of transfusion that might be responsible for the chills and temperature which were present in some patients and not present in others? This was found upon investigation not to be the case. Further, a number of cases occurred in which blood tests had been made and yet hemolysis had occurred. In each one of the cases where hemolysis had occurred where hemoglobin or hematoporphyrin appeared in the urine in small or large quantities, the blood was subsequently referred to other serologists who knew nothing of the circumstances, and in each instance it was found that

* For original article see page 42.

the first serologist was in error. In other words, laboratory workers had their limitations and it is only by constant vigilance that these cases of hemolysis can be eliminated. I finally got to the stage where I was even unwilling to submit my tests to any other serologist, so I did the tests myself. The results were as follows:

"Sometimes it requires one donor, sometimes two donors, sometimes three donors, sometimes twelve donors, sometimes twenty donors, sometimes forty donors and as many as seventy donors were tried before I was willing to accept one for a certain case. It may be possible to obtain the right blood in the first case tried, but in one case it took seventy donors before the right one was obtained. Chill reactions in personally supervised cases were reduced from 33 per cent. to 8 per cent. and even that 8 per cent. I think can be somewhat reduced with increased care. There was not a single case of hemolysis and not a single untoward result from transfusion in the last 200 cases which I tested myself. I think this demonstrates that hemolysis and posttransfusion reactions that occur are due to errors in the laboratory that can be avoided by the most careful kind of work.

"After satisfying myself with the compatibility of the blood my next interest was centered in blood transfusion therapy. Having a valuable measure at our disposal, what is it good for? I have tried it out in a large variety of cases."

At this point in the discussion, the doctor referred to a paper which he wrote on this subject a year or two ago in which he pointed out the possibility of altering the blood of a donor to meet the need of a given case. Continuing, he said:

"This is the first case of the kind that I have met with and here we have something which, for want of a better word, is nothing short of dramatic, not only in its scientific aspects, but also in its clinical manifestations. If you look at the temperature chart in this case you will see that this patient had a little fever, which is characteristic of adults in acidosis, and at the point where she was transfused, we get a little serum reaction indicated by the temperature. In the second transfusion we get a serum reaction again after which the temperature runs practically flat. As we pointed out in the paper more striking are the figures in the other charts. Urine analyses can only give us an idea of what the patient is putting out and not what he has within. What is making the patient sick is not always what is put out, but what is retained.

"We are indebted to Cyrus Field for his very careful analysis of the blood. Dr. Ely has already commented on it. I cannot say very much more on those charts. The most important figures are the figures of the carbon dioxid absorption: the patient jumped from 55 to 94 per cent. It cannot be accounted for by the simple law of averages. It must be due to something which has actually happened in the patient. For instance, the donor has a blood alkalinity of 80 or 90 per cent. and mixing it with 55 per cent. alkalinity of the patient's blood we get, perhaps, 65 or 70 per cent. average. What has happened there is this: the blood of the donor

had been highly alkalinized. This high alkalinization was manifested by one fact, namely, that two days after the donor was tapped and 1100 c.c. of blood were removed, the hemoglobin which should have been 70 per cent. registered 115 per cent. on the Dare scale. In acidosis the blood is very light, the effect of alkali on the blood is to deepen the red tint of the hemoglobin. In the alkalinized donor the amount of hemoglobin was the same as a nonalkalinized donor similarly tapped and yet the effect of the alkali on the donor was such that it caused it to register 115 per cent. instead of 70 per cent.

"In talking this over with some of the chemists and clinicians in town I was told that it was impossible to increase the alkalinity of the blood, and if increased it would be incompatible with life."

After a reference to hydrogen iron, the doctor continued, saying: "I subjected this problem to experiment in order to prove the point I made because I was certain that something had happened to that blood, and I was certain that no blood could have registered 115 per cent. when it should have registered 70 per cent. (this experiment will be reported in full elsewhere) unless there was something intrinsic which had occurred in the blood, so I took a man and gave him what I thought were the same doses of sodium bicarbonate that were given to the donor in this case. Blood and urine analyses were made before the administration of the alkali and analyses were made in subsequent periods, at the end of two hours, at the end of four hours, at the end of eight hours and at the end of twenty-four hours. It was impossible to get any variation in the CO_2 content of the plasma and it was also impossible to get any variation in the actual sodium present by reducing the blood to an ash and measuring the amount of sodium obtained from such an ash. It looked a bit disappointing. One thing, however, was noted and that was that the urine was very alkaline and this alkalinity appeared very shortly after the administration of the sodium bicarbonate. In measuring the amount of bicarbonate given to the donor and to the man on whom I experimented it was found that I was giving this man practically 40 per cent. of the amount that had been given to the donor in this case. Furthermore, it was found that the alkali was eliminated so fast that unless we got the blood at shorter intervals the alkali would appear in the urine before we had a chance to measure it in the blood, so a second man was put to the test. He was fed 20 grams of alkali in one dose. He received his first dose at ten o'clock in the morning and his last dose at midnight of the same day. It was fed to him every two hours and at the end of the eighth dose of alkali in the form of sodium bicarbonate, amounting to 160 grams, which in grains is 2400, the blood was taken at intervals from this man. Before the administration of the alkali the carbon-dioxid plasma registered in terms of carbon-dioxid content, 0.66. Twenty minutes after the fourth administration of alkali it registered 1.01, which is a higher degree of alkalinity than any one of us in this room here possesses. At the end of forty minutes he had 1.03, a trifle higher than at the

end of twenty minutes. Now, the next significant point is that at the end of an hour and ten minutes he had 0.97 of carbon-dioxid content. The next morning he had 0.89, showing that this alkalinity at first rises very high in the blood and then gradually disappears. It was furthermore evident that it was necessary to give such a huge amount of alkali that the kidneys were unable to excrete all the amount offered to them, so the alkali must necessarily be present in the blood. The hydrogen ion concentration had diminished from 0.78, which is practically normal, to 0.7756. The actual milligrams of sodium in the entire blood have not as yet been analyzed. I expect to have that finished in the course of the next few days, but these figures prove the case, and if one were to sit down and write figures in order to prove his case no more ideal figures could be offered to you than these which have been proven in this experiment. We have here a new method of treating what is one of the most helpless conditions of aberrant intermediary metabolism. The administration of alkali, as we pointed out in the paper, is possible by mouth, by rectum, under the skin and into the veins. When your patient vomits persistently the amount of alkali that the patient can take into the stomach is decidedly limited. If the alkali is administered by the rectum a mucous colitis after a time is set up and the absorption and retention of the alkali is markedly diminished. Introduced under the skin it is very painful and causes a charring of the tissues. When you overalkalinize the blood the blood is apt to be converted into a jelly. Introduced into the blood stream some of the bicarbonate is converted into carbonate and it is impossible to measure in milligrams the amount of carbonate that you can safely put into the blood."

The doctor concluded his remarks by citing a case which he had in Connecticut several years ago in which the administration of sodium bicarbonate resulted in the patient's blood being converted practically into a jelly, and this after the second administration. In that case the doctor stated he had been instructed to give 30 grams of sodium bicarbonate per liter.

DR. ROBERT T. FRANK, said: "The questions arising in this case are rather complicated. In the first place, is this a case simply of acidosis? Ordinarily in acidosis during pregnancy emptying the uterus is followed, either promptly or fairly promptly, by recovery or death. Here this patient lingered at least twelve days with practically no improvement after the operation, and yet she did not die. That in itself is somewhat different from usual.

Q. "I would like to ask Dr. Ely what her hemoglobin was before the transfusion. Was it high? Was it low?"

A. "It was low, about 55 per cent. or 60 per cent.; I have forgotten."

"Evidently not very low.

Q. "What did the urine show? Were there any particular abnormalities in the urine?"

A. "No. The usual analyses did not show any."

"It seems to me that it is very hard to determine whether this

is a simple case of acidosis uncomplicated by some other condition, as, for example, a grave liver involvement.

"The interesting question is, What did the transfusion do in this case? I agree fully with those clinicians and chemists who told Dr. Lindeman that the blood alkalinity cannot be changed. The mechanism which governs the alkalinity of the tissues and of the blood is one of the most important factors upon which the welfare of the individual depends; it is a very clever one and a very complete one. There is a coarse mechanism by which large quantities of acid can be taken care of dependent in the main upon the quantity of sodium and calcium and magnesium in the blood. In addition to this, there is a very finely balanced, minute mechanism, which is due to the fact that phosphoric acid is combined with sodium and hydrogen in such fashion that you can have a sodium acid phosphate, the symbol of which would be $\text{NaH}_2\text{P}_2\text{O}_4$, or it can change into $\text{Na}_2\text{HP}_2\text{O}_4$. In other words, by adding the acid radicle or discarding a hydrogen atom the compound becomes either alkaline or acid. This is a very delicate mechanism. Of course, it is possible temporarily to poison individuals by enormous doses of bicarbonate of soda such as Dr. Lindeman used in his experiments. That such poisoning of the donor is either wise or will be efficient in transfusion I very much doubt because the slight increase of actual alkali which is transmitted by the transfusion is so minute that the mechanism of the recipient will at once balance this slight increase in alkalinity. In other words, if the transfusion works in these cases (and this case while striking, of course, is only a single instance), if numerous further instances can be adduced the theory of its action must be explained in some way other than by simple alkalization. The reason I asked whether the hemoglobin of the donor was very low is that through her prolonged illness there might have been produced an anemia which was relieved by transfusion.

"The second thing I want to call attention to is this: These acid products, after all, although they are acute poisons, only act in an extremely limited way. They are simply indicators of the profound and deeper change present in the liver. The liver is unable to perform its functions. Consequently these acid products occur in the blood and in such quantities that they no longer can be eliminated.

"Then I want to warn against using chemical figures which in the one case are derived from a patient in a condition of acute starvation and in the second figures from a patient who is receiving plenty of nourishment. The only figures of proof would be such, for instance, obtainable in animals, in which you have a starved animal in a condition of acidosis and, on the other hand, a normal animal starving, but not yet in a condition of acidosis. The comparison is not fair because the conditions are different.

DR. AUSTIN FLINT, JR.: "I feel I cannot contribute anything to the discussion except to say that the case presented is unique. The paper opens up a field to obstetricians which so far hasn't been opened up at all, and it seems to me, it holds out a promise which

might help us in conditions of acidosis of pregnancy, which, as we all know, is a serious thing. I am particularly interested in this because I have had a patient in the last week who is pregnant showing acetone and diacetic acid, very persistently, with traces of albumin in the urine. I saturated her as much as I could with alkalis by mouth, which she took well, and I am glad to say that after four or five days of such saturation the urine became, first, neutral and now alkaline and the diacetic acid has disappeared, much to my relief. She had no casts or evidences of kidney disease. I do not know whether if I hadn't been able to change her urine and the albumin persisted, it would have been necessary to terminate the pregnancy.

"I think we ought to feel very grateful to Dr. Ely for bringing this before us for our instruction and for further study."

DR. J. MILTON MABBOTT, in discussion, said: "I would like to refer to the statement made by Dr. Frank and to ask for information as to whether he stated, or intended to state, that oxidation occurs in the liver; the oxidation of other things besides proteids, oxidation of sugar, for instance, whether it doesn't occur in the tissue cells throughout the body. Does Dr. Frank intend to convey the idea that the oxidation of sugar, or glucose, in the system occurs in the liver?"

DR. FRANK: "No. What I meant was that oxidation is limited to the liver. It takes place in the cells and all other structures in the body, but the main metabolic intake is taken care of in the liver before it reaches the rest of the body through the circulation."

DR. MABBOTT: "Then, of course, the pancreas is instrumental in furnishing to the blood hormones or internal secretions, elements which the tissue cells throughout the body absolutely require in order to enable them to oxidize certain products—at any rate, sugar. That, I think, has been demonstrated by experiments at the Rockefeller Institute."

DR. A. H. ELY: "I have nothing to add so far as the physiological chemistry is concerned. I presented the paper believing that it opened up a field that would be interesting to all of us. There are even mild degrees of acidosis that sometimes try us and certainly in private practice these cases can be and should be more constantly kept under observation. I feel that with knowledge and ability to aid us in not only finding a means of relieving suffering but perhaps saving life we should do so. As I brought out my conclusions it seemed to me that while this case presented an unusually severe acidosis it is well worthy of further investigation and particularly one that this Society ought to be tremendously interested in.

Dr. Lindeman can answer Dr. Frank with regard to certain of his ideas relative to the effect of alkalization of the blood in his experiments."

DR. EDWARD LINDEMAN, in a further discussion, said: "When a state of acidosis takes place there is something interfering with the intermediary metabolism. We can localize that to a considerable degree in the liver. When we give an alkali we simply neutralize

the acid. In transfusion oxidases are introduced, thus we attempt to repair the break in the chain and relieve the liver of the toxic effect of the unoxidized unsaturated fatty acids in the blood. By introducing oxidized substances present in the normal blood we appear to more completely oxidize what the liver cannot do.

"Dr. Frank said that the amount of alkali that can be put there is very small and he agrees with the clinicians and chemists with whom I spoke regarding the alkalinity of the blood. Fortunately I showed these same figures to the same clinicians and chemists yesterday and they agreed with me that according to the figures, it can be done. These figures cannot tell a false story.

"I mentioned the fact that before alkalization the donor had 0.66 of carbon dioxid of plasma. That has nothing to do with sodium phosphate or any other kind of phosphate. It shows what sodium bicarbonate was present in the plasma and that is an index of the alkalinity of the blood. The second figure after alkalization was 1.01. In other words, the alkalization of the blood was increased almost 53 per cent. If that isn't sufficient or too small an amount, I think our case of alkalizing the donor must fall. But I am reasonably certain it will not."

DR. WM. E. CALDWELL read a paper on

A REPORT ON THREE CASES OF LABOR FOLLOWING
VENTRAL SUSPENSION.*

DISCUSSION.

DR. EDWIN B. CRAGIN said: "Some years ago I read a paper before the American Gynecological Society relating some experiences that I had had with fixation first and then with suspension and reached the same conclusion, that neither a fixation nor a suspension was a safe operation on a woman in the child-bearing age, and although most of the members recognized the danger of a fixation, they hadn't at that time recognized the danger of a suspension.

"It is no discredit to a late surgeon of this city, Dr. Frank Markoe, to say that Dr. Markoe and I had a case in common. Recognizing the danger of a fixation and realizing the importance of another child in this family, he performed a ventral suspension in the most careful way and with a beautiful surgical result and I delivered that woman in her first pregnancy after his suspension. It was an easy delivery and we both felt that the suspension in that case had been a great success, and yet her next pregnancy brought the result shown here to-night. The suspension had become a fixation in the meantime and I had to take her to the Sloane and perform a Cesarean section, so, in the first place, we have to recognize that a fixation is not safe and, in the second place, that a suspension may become a fixation and give all the dangers of a fixation.

"Before I sit down there is just one thing more that I would like to say and that is this: some women are peculiarly prone to adhesions

* For original article see page 50.

in the abdomen, whatever operation we do, and even in such an operation as the Gilliam, which I have done over 500 times, I have had one case in which a man in Boston had to perform a Cesarean section where the fundus was adherent to the abdominal wall, although the fundus was not intentionally suspended and it was not intentionally touched.

DR. HIRAM N. VINEBERG: "May I ask Dr. Cragin to define to us the difference between a ventral fixation and a ventral suspension?"

DR. CRAGIN: "May I answer that question now? I am simply taking the definition made by Kelly who devised his operation of suspension after he knew the dangers of fixation where we used to suture the fundus not only to the subperitoneal tissue and the peritoneum, but to the fascia. Kelly in his operation sutured the fundus only to the peritoneum of the abdominal wall and subperitoneal tissue, the sutures not passing through the fascia. That was the distinction made by Kelly in his effort to avoid the dangers from fixation."

DR. VINEBERG: "I do not think that is a good definition. I don't think it makes much difference after all whether you pass your sutures through the fascia or peritoneum. The difference as I understand it and as it was formerly understood, was that when you did a ventral fixation you scarified the anterior wall and removed or cut away the peritoneal covering of the uterus and got an adhesion between the muscular body of the uterus and the fascia of the recti. In fact, the peritoneum was left uncovered at that point. It is a fixation in the lesser sense and was known as Czerny's operation."

DR. AUSTIN FLINT, JR.: "I must confess that I rise again to speak with some diffidence, having risen several times before, but my excuse is that I am familiar with all the cases as they occurred in my service in the hospital.

"There are two points brought out by the paper which I think will partly account for the reason that the subject was worked up. One is the prevention of such a condition, and the second is, What are we going to do with this condition when it exists? I don't think there is much room for a discussion of the prevention. Nobody ought to fix the uterus in the child-bearing period unless the patient is sterilized. There is only one other point in the matter of prevention and that is, when we find such conditions as were present in the second case—dense adhesions all over the abdomen and ovarian disease—we should take into account the possibility of the woman becoming pregnant and try to prevent that possibility by division of the tubes or some other method of sterilization during the operation.

"A more interesting question is, What are we going to do when you have to deal with the case of a woman in pregnancy with a mass of adhesions between the abdominal wall and uterus?"

At this point in the discussion Dr. Flint referred to the question of delivery by Cesarean section or by way of the vagina, the latter method on the theory that it is safer.

Continuing, he said: "In this series one patient was delivered

through the vagina and two had Cesarean sections. All three died. I have had one other case where a woman died after Cesarean section for adhesions between the uterus and abdominal wall.

"In the first case reported in the paper, the baby was dead, and the leg was down in the vagina and it seemed (I saw the case with Dr. Caldwell and the other members of the staff) that it would be easy to extract that dead child through the vagina, using a moderate amount of force, more safely than we could operate on her by Cesarean section. The adhesions were tremendously dense, covering the whole anterior surface of the abdomen. I would like to emphasize the fact that a great deal of gentleness was used because we knew of the conditions present, and still she died in an hour or two and it was impossible by ordinary digital examination to find any rupture of the uterus. Rupture of the cervix? Yes, but we see lots of cases with torn cervixes and the women do not die.

"In the other two cases Cesarean section was the alternative chosen. It wasn't that they died because of the Cesarean section, but because of the tremendous amount of abdominal complication existing in addition to the uterine adhesions, intestinal adhesions, lots of them, and in the last case a condition of sepsis before the woman came to operation. I happened to remember that in another hospital where she was discharged she refused operation and went home and, as can be said of so many of these desperate cases, she turned up at Bellevue as a sort of last resort.

"A thing that might be brought out in this discussion is, What is the safest procedure to follow in such cases when dense adhesions exist? That is, What is the best way to deliver a woman who has dense adhesions following one of the operations for uterine suspension or fixation? That, it seems to me, is a problem that is still unsolved." At least as far as any hard and fast rule is concerned.

DR. WILLIAM S. STONE: "Dr. Flint brought out a point which leads me to say that I believe that all these cases should be individualized in regard to their method of delivery, but, as he explains in his first case, the presence of a leg in the vagina is not altogether a satisfactory indication for delivery per vaginam. It depends upon how much more than the leg is in the pelvis and it seems to me that such an indication has accounted to a great extent for much of our bad operative obstetrics; that is to say, it is a temptation to think that because there is some small part of the fetus in the pelvis we can disregard the serious conditions above, and I believe it would be impossible to give any general advice on the best way to treat such cases. The cases that have been reported to-night vary tremendously in the actual conditions present when operation had to be performed."

DR. WILLIAM P. POOL said: "The definitions of the operations of ventrosuspension and ventrofixation which have been given do not conform to my previous ideas of these operations. I have believed that ventrosuspension is performed by bringing about an attachment between the uterus and the peritoneum of the anterior abdominal wall, but that ventrofixation requires that the fundus be

brought through the peritoneum and sutured firmly to the under-side of the muscle, while the peritoneum is sewed about it.

"It seems to me that the specimens shown to-night do not make out a good case against ventrosuspension during the child-bearing period, because there has been something more than mere suspension in each one of them. The adhesions exhibited in all of these cases indicate a considerable degree of peritoneal inflammation, and are not at all typical of the normal condition following the usual ventrosuspension. We have had experience with a considerable number of labors following ventrosuspension without dystocia, and I have also had the opportunity to see the results in three cases where the abdomen had been reopened for some other cause. In these cases the uterus was not in direct contact with the abdominal wall, but was suspended to it by a false ligament which allowed a considerable degree of mobility. This is what ventrosuspension aims at, and we believe that such cases do not have dystocia. The point of the operation is to avoid fixation, and to get a true suspension of that character."

DR. GEORGE W. KOSMAK said: "There is just one point that might aid us in attempted prognosis in these cases which Dr. Flint referred to. At the Lying-In Hospital we have had quite a number of them and from past experience the position of the cervix and head always gives us some indications as to the probable outcome of the delivery. In two of my own cases which I reported in the paper referred to, a ventral suspension was done after the manner of Kelly and in both instances a delay occurred in the engagement of the head, but the cervix was in the axis of the birth canal. In both of those cases waiting a little while and stimulating the pains finally resulted in pushing the head into the pelvis and delivery by the natural passages took place. In the other cases which we have had at the hospital in which we found it necessary to do a Cesarean section, the cervix was inverted in the posterior position and the head would not come into the birth canal because the axis of the uterus was in such a position that engagement could not take place.

"I think it might be a safe rule to follow that if the cervix is in the line of the birth canal and the head engages, a delivery through the natural passages is possible, whereas if the cervix is posterior and remains so, no attempt should be made to deliver the fetus by the natural passages, because if you do, whether by version or other means, you are bound to produce in almost every instance a rupture of the uterus.

"In a few cases of this kind in which I have done abdominal Cesarean section, where adhesions took place between the fundus and abdominal wall, the results were very good. I didn't lose any of the cases. The last one was only a few weeks ago, a Greek woman, previously operated on in Greece, probably a Kelly operation. This was followed by rather extensive adhesions and the uterus was so fixed to the anterior abdominal wall that I did an extraperitoneal Cesarean section through the line of adhesions. On opening the abdomen I found that, although there was a strong band between

the lower segment and the abdomen, the upper adhesions were almost made up of omentum; at least, the omentum had slipped down between the uterus and abdominal wall. There was no post-partum hemorrhage and although a part of the abdominal wound became infected, very good final result was obtained. In that case the cervix was high up posteriorly and there was no attempt at engagement of the head, so, personally, I feel that the fact noted would be a fairly safe method of diagnosing the eventual delivery in these cases."

TRANSACTIONS OF THE BROOKLYN GYNECOLOGICAL SOCIETY.

Meeting of February 4, 1916.

The President, DR. WILLIAM P. POOL, in the Chair.

DR. L. GRANT BALDWIN reported a case of

INOPERABLE CANCER OF THE CERVIX WITH AMENORRHEA.

Mrs. X., aged forty-two, Italian, married seventeen years and never pregnant, consulted me for amenorrhea. Twenty-three months ago she had amenorrhea for twelve months. Following this she menstruated regularly for seven months. When I saw her she had not menstruated for four months and for this alone she sought advice. The most rigid questioning failed to bring out any evidence of pregnancy or of spotting at any time during these periods of amenorrhea. There was no irritation about the pudendum or other evidence of a vaginal discharge, the existence of which she positively denied. The examination revealed the cervix completely involved with cancer to the vaginal junction, with fixation of the uterus. She was well nourished and had no symptoms whatever of malignant disease. The lesson is that, even with amenorrhea, a woman may have cancer of the cervix.

DR. ALFRED C. BECK reported

TWO INSTANCES OF WEAK UTERINE SCARS FOLLOWING CESAREAN SECTION.

CASE I.—Mrs. A. R., aged twenty-seven, Italian, was delivered two years ago by Cesarean section. After having been in labor for twenty-four hours the patient was sent to the hospital by a midwife who had been in attendance. Examination on admission showed the fetus presenting by the vertex with considerable overriding. The pelvis was generally contracted, the diagonal conjugate measuring 9 cm. Conservative Cesarean section was performed. The puerperium was febrile. On the seventh day the wound

showed infection and opened up down to the peritoneum. After six weeks the mother and child were discharged in good condition. Four months later the patient returned to the clinic with a hernia at the site of the abdominal incision. In July, 1915, she reappeared at the clinic when it was discovered that she was about three months pregnant. On Jan. 6, 1916, abdominal examination through the hernia showed a thinned-out area in the anterior wall of the uterus as a result of which fetal parts could be very easily outlined. As the patient was within ten days of term it was thought unwise to allow her to remain at home and run the risk of rupture of the uterus when labor commenced. She accordingly entered the hospital where, on the following day, a second Cesarean section was performed. The anterior surface of the uterus and the omentum were densely adherent to the abdominal wall and the uterine scar was found to be very much thinned out. The uterus was entered through these adhesions, making the operation extra-peritoneal. The puerperium was uneventful and the mother and child left the hospital in twenty-two days.

CASE II.—Mrs. A. G., aged twenty-seven, Italian. The previous pregnancy, in 1914, was complicated by eclampsia. She was brought to the hospital after the third convulsion. Because of the fact that she was a primipara at term, with a large fetus and not in labor a Cesarean section was done. The puerperium was afebrile after the third day. The mother and child left the hospital on the twenty-fifth day. On Jan. 26, 1916, this patient again entered the hospital in labor. Examination showed the fetus lying obliquely with the breech in the left iliac fossa and the head in the right upper quadrant. The cervix was almost fully dilated and the membranes were intact. Under anesthesia it was found impossible to move the head in any direction and it was thought that it was bulging through the thinned-out scar of the previous Cesarean wound. The membranes were ruptured, a foot was brought down and the child was delivered by breech extraction. During the extraction the lateral mobility of the head was restricted until the breech had descended sufficiently to allow the head to be pushed out of the bulging portion of the uterus in which it was held. Unfortunately the uterine cavity was not explored because of the fear of infection.

DISCUSSION.

DR. HUSSEY.—In regard to the doctor's last remark about toxemia, I am reminded of a case in which I did a Cesarean section in a primipara seven or eight years ago for eclampsia, the first done in Brooklyn, I think, and which I reported here. The point I want to bring out is, that although she was not a very large woman and had a justo-minor pelvis, she later delivered herself of a second, third and fourth baby without any trouble. The question of post-cesarean scar difficulties is a most interesting one. I have had several unfortunate results with these cases. I have operated on four cases for rupture, three of our own and one from another hospital. Two

of these cases ruptured with the third child and one with the fourth. Every woman who has had a Cesarean is a risk in subsequent labors. I do not know how we can tell how thin the scar is or what the danger is but we must be prepared for rupture and every such case should be delivered in a hospital.

DR. COMMISKEY.—The first of Dr. Beck's cases comes under the head of the possibly infected women and those of us who have access to the larger clinical facilities come in contact with them not infrequently; and it is just here that opinions and experiences differ as to the best method of treatment. It has been my plan in these instances to make a large incision, deliver the uterus out of the abdomen, close the abdominal wall temporarily by means of clamps behind the uterus and protect the peritoneal cavity with several large pads or sponges. The uterus is then incised, emptied, sutured and washed with saline externally, the field of operation redressed and the uterus returned to the abdominal cavity. The results have been most encouraging.

The second case brings to my mind an instance of a woman delivered by Cesarean section of her first child after a test of labor; during her puerperium she ran a low fever for several days but nothing definite could be found; fourteen months later she delivered herself spontaneously of a full term infant, weighing eight ounces less than the first child at birth. On palpating her uterus through the abdominal wall within eight hours of delivery, a cleft or furrow three inches long and one-half inch wide could easily be felt in the anterior uterine wall; a diagnosis of incomplete rupture of the uterus at the site of the former incision in the uterus was made. Her temperature and pulse remained normal and there was no excessive bleeding, so she was allowed to go for ten days at which time a hysterectomy was done. The uterus showed an incomplete rupture as diagnosed, her recovery was normal.

DR. BECK.—In the first case the placenta was quite close to the scar. In the second the position of the placenta was not determined and we did not palpate the scar.

DR. EARL H. MAYNE reported a case of

CESAREAN SECTION FOR ACCIDENTAL HEMORRHAGE.

He was called on the 23d of December to see a woman who was seven months pregnant. At twelve o'clock that day she had started to bleed and her physician was sent for, who found her bleeding moderately. He packed the vagina but the bleeding commenced again and he repacked her, the last packing controlling the hemorrhage about two hours. When the hemorrhage commenced again the doctor sent the patient to the hospital. About seven P. M. she began to bleed profusely. Dr. Mayne saw her about eight o'clock when they said she had lost about a quart of blood. On examination he found a very small os, through which it was impossible to introduce one finger. The patient was in bad condition. Taking into account the condition of the cervix it was decided to

do a Cesarean section. A three and one-half pound baby was delivered. The placenta was almost entirely detached and there was fully a quart of blood and clots in the uterine cavity. The patient went home on the fourteenth day. This woman had had three children at full term. Whether the vaginal packing had any thing to do with the continuance of the hemorrhage cannot be stated.

DR. ALFRED C. BECK read a paper on

EXERCISE ON 'ALL FOURS' AS A MEANS OF PREVENTING SUBINVOLUTION
AND RETROVERSION.*

DISCUSSION.

DR. HYDE.—I had an opportunity this summer of watching some of the cases under Dr. Beck's care and the results were interesting. The only case in which there was a failure was one in which the patient confessed that she had not followed instructions. The knee-chest position has been one of the points which has interested me and I have seen cases where this position has not brought about good results, particularly in retroversion because of neglect to properly instruct the patient. There are very few who understand the knee-chest position: they simply ask the patient to assume that posture in bed and expect that to bring results. To be effectual the perineum must be retracted and air admitted to the vagina. I instruct the nurse how the perineum must be retracted, and with virgins I often take a glass catheter and let air into the vagina while the patient is in the knee-chest position. It would seem to me that active physical exercise must increase the heart action and better the circulation in the uterus. I do not see how walking on all fours can do it except by improving the circulation and thus stimulating involution.

DR. GIBSON.—One interesting point brought out by Dr. Beck is the care of the woman in the third and fourth weeks of her puerperium. This is the period which is most often neglected. We will often examine a woman at the end of the second week and find the uterus in good position and at the end of a month find it retroverted and subinvolted. I have made it a rule to insert a pessary at the end of the second week which is worn for three months and the results have been most satisfactory. It is much easier for the woman to wear a pessary than it is to get her to carry out these exercises.

DR. BALDWIN.—We have all gotten beyond the teaching of my college days that six weeks is the time it takes for the uterus to involute. There are cases in which the process is completed in ten to fourteen days. I believe that the placing of a pessary at the end of fourteen days will bring good results. If the uterus is kept in position it will involute.

DR. BECK.—Regarding the use of the knee-chest position, the great difficulty is that it is very uncomfortable, and patients will

* For original article see page 75.

not continue its use after leaving the hospital. With the class of patients we have to treat I believe the knee-chest position is out of the question. Of the five failures, three of the patients did not exercise more than five days, so in reality there were only two failures in thirty-four cases which is almost as good as the pessary can do. Not infrequently the patient forgets to come back after the pessary is inserted.

DR. JOHN O. POLAK read a paper on

TRANSPERITONEAL CELIOHYSTEROTOMY.*

DISCUSSION.

DR. POMEROY.—Have there been enough cases operated upon in this fashion to determine the ultimate result of the anterior fixation and the relation of this fixation to the technic of a possible later Cesarean section? Also is this procedure to be used for all Cesarean sections rather than attempting to make a selection of cases? These are propositions that take time to decide and must be considered in judging of its value as a standard procedure?

DR. HOLDEN.—Dr. Pomeroy has brought out an important point; it is inadvisable to do this operation in all cases, but only in the cases that have been examined too many times before being sent to the hospital. I think this operation is superior to the Davis operation.

DR. HUSSEY.—I cannot discuss an operation which I have not performed. I am reminded of a case I operated upon about a month ago. She had been in labor four days. The membranes were ruptured and the baby was dead. She had a pelvis through which I felt I could not deliver with an embryotomy. The pulse was 150 and the temperature was elevated. I did a Cesarean section. She was in such poor condition that I did not feel like taking out the uterus. She made a very good recovery.

DR. POLAK.—Dr. Hirst has discarded the classical operation and now has a record of thirty-one cases of this operation without a death and without suppuration. He is an enthusiast but true as regards his statistics. I spoke of this matter before the Lying-in Hospital men the other night but they think the A. B. Davis operation which they are using is just as safe. No other clinics that I know of in this country have used it. Regarding the fixation of the uterus. The first case reported was operated upon by Dr. Holden. This woman has her cervix fastened to the lower angle of the wound, the body of the uterus is retroflexed. We made the fixation a little too low. Of the other five cases, one is still in the hospital, four have the uterus in good anteversion. Regarding the criticism of this method, the English do an anterior fixation of the body of the uterus for retrodisplacement without complications in subsequent pregnancies. Perhaps you remember Charles Green's paper in 1910 against sterilization. I had the privilege of presenting the paper on sterilization in Cesarean section. He wrote against it on

* For original article see page 72.

the ground that he could fix the uterus and do his subsequent Cesarean without opening the peritoneal cavity. In the case which Dr. Beck has reported to-night where the omentum came down over the scar with adhesions to it and the parietal peritoneum, all we did was to split the omentum and deliver the child through the hole, an extraperitoneal procedure. Regarding suture of the uterine peritoneum at the upper limit of the incision to the fascia; this procedure fixes the uterus snugly against the parietal peritoneum and prevents the peritoneal surface tearing away and allowing amniotic leakage during delivery.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY

Stated Meeting of January 25, 1916.

DR. GEO. W. KOSMAK, M. D., *in the Chair.*

SARCOMA OF THE OVARY COMPLICATING THE PUERPERIUM.

DR. GEORGE L. BRODHEAD made this case report. The patient was a negress, eighteen years old, who presented herself at the pre-natal clinic of the Harlem Hospital on September 9, 1915. The history was negative, nothing abnormal was found in the abdominal examination, and on October 25, 1915, at term, the patient was delivered normally of a living child, with moderate hemorrhage and no laceration. On the day following delivery, the condition was good, the temperature 100.5° F. On the second day following delivery, the temperature was 101.4° , pulse 96 and she had no complaints. On the third day following delivery the temperature rose to 102.5° , pulse 132, and the patient complained of pain and tenderness in the abdomen. The left side of the abdomen was soft and slightly tender, but there was marked tenderness and rigidity in the right inguinal and lumbar regions, in the epigastric and upper umbilical regions. The leukocytes were 17,000, the polynuclear count 88 per cent., lymphocytes 12 per cent. On the fourth day, the temperature rose to 103.2° , pulse 130, the tenderness and rigidity increased, and vaginal examination showed some tenderness in the fornices. For the next seven days, until the day of operation, the temperature varied usually between 101° and 103° , and after the operation remained normal. Various diagnoses were made by the surgical staff but finally on November 2, eight days after delivery, a mass could be palpated in the right lower quadrant, tender, elastic, and slightly movable, and a diagnosis of abdominal tumor was made. The blood count now showed leukocytes 21,000, polynuclears 74 per cent., the urine showed a faint trace of albumin and there was a positive

glucose reaction. The patient was transferred to the service of Dr. I. S. Haynes who performed laparotomy and found a sarcoma of the right ovary measuring $15 \times 8 \times 6$ cm., bluish in color, with greatly dilated veins. The patient made an uninterrupted recovery, and left the hospital in good condition.

The report of the pathologist was as follows: Specimen an ovarian tumor, size of a child's head, very soft in consistency, brownish red in color, smooth capsule, slightly lobulated and showing fibrous bands. Cut section showed reddish granular appearance and no surface markings. The microscopical section showed spindle cells very numerous with fairly well-stained nuclei and somewhat granular necrotic protoplasm, the tumor apparently outgrowing its blood supply. The vessels were few and thrombosed. The cells were arranged around them in a radiating manner very like a perithelioma. The fibrous tissue was very slight in amount. The diagnosis was spindle-celled sarcoma.

CESAREAN SECTION FOR UTERINE INERTIA AND CONTRACTED PELVIS.

DR. GEORGE L. BRODHEAD reported the case of a patient, twenty-eight years old, married, who became pregnant for the first time about February 1, 1915, and the confinement was estimated for about November 1, 1915. She was a strong, healthy woman, and the external measurements were spines, 23, crests, 27.5. The transverse at the outlet was 8 cm., and the promontory could not be felt. On November 13, 1915, labor began at 8 p. m., positive R. O. A., head above the brim. On November 15, at 9 a. m., the cervix was thin, and admitted one finger, the pains being irregular, and the vertex was still above the inlet; the cervix admitted two fingers, and the patient was discouraged, having had pains for eighty-six hours. The membranes were still intact and the fetal heart strong. A careful examination showed a moderately large head floating above the brim, and a moderately contracted pelvic inlet. Under the circumstances, the uterine inertia being marked, it was deemed advisable to perform Cesarean section. The usual incision was made, 3 inches above and 3 inches below the navel, and a living child weighing $7\frac{3}{4}$ pounds was extracted. The recovery was uneventful, mother and child leaving the hospital in excellent condition.

VAGINAL CESAREAN SECTION FOR BLIGHTED OVUM.

DR. GEORGE L. BRODHEAD reported the case of a woman, nineteen years old, who was married in March, 1915, and had her last menstruation on March 27. About July 1, she began to bleed and was treated for threatened abortion; the bleeding continued for about eight weeks when it ceased. The family physician sent her to Dr. Brodhead on November 19, 1915, stating that the uterus had not changed in size since July. Upon examination the uterus was apparently enlarged to the size of a three months' pregnancy, and the patient was informed that in all probability the pregnancy had

proceeded normally until about July 1 when the fetus died, and the uterus had been unable to expel the blighted ovum. The patient consented to operation, and a vaginal section was done. A placenta of about three months' development was removed, the fetal sac was distinct, but no trace of the fetus could be found, absorption having taken place. Since this patient was operated on, another patient had aborted in the Harlem Hospital service, the seven to eight weeks' ovum having remained *in utero* for about four months.

The condition while rare was met with frequently enough to make one guarded in a prognosis of a supposed threatened abortion; for, while bleeding might entirely cease and the patient feel perfectly well again, the uterus would not increase in size, and sooner or later would be emptied of the blighted ovum.

DISCUSSION.

DR. HOWARD C. TAYLOR asked Dr. Brodhead if he said that there was no fetus found and, therefore, was it absorbed? Could a fetus be absorbed in the interior of the uterus?

DR. BRODHEAD replied that that was his impression as he had seen a number of blighted ova of various periods of development with no trace of the fetus and many of those patients had been very carefully observed. In this instance the sac was intact and there was quite a little fluid present, but the fetus, of course, might have escaped.

DR. ALFRED M. HELLMAN said that he had a similar case to the last one reported by Dr. Brodhead. The patient had one profuse hemorrhage and complained of cramp-like pains at night. There was no dilatation of the cervix. Although she was six months pregnant, the uterus was the size of a four months' pregnancy. He doubted the history given. She was observed for one week or ten days and then sent home. Ten days later she returned stating that her pains were worse and that there was a slight discharge stained with blood. He again examined her and found no apparent change and no cervical dilatation and she was sent home for another week. She was watched for five weeks in all and still there was no increase in the size of the uterus. Knowing that she was pregnant and that the fetus must be dead he introduced two rectal bougies and packed the cervix and vagina with gauze for thirty-six hours, when she delivered herself of a good-sized placenta, undergoing cystic degeneration. The placenta looked like a multitude of small parovarian cysts.

DR. HERMANN J. BOLDT had seen many cases where the ovum had advanced to two or three months and yet he could find no trace of the fetus at all. The size of the placenta corresponded to a two or three months' pregnancy.

DR. BROOKS H. WELLS had seen several cases in which the sac was apparently intact and yet no fetus could be demonstrated and he took the ground that the fetus had died at an early stage, and had become absorbed.

DR. FRANCIS W. LANGSTROTH, JR., reported the case of a woman who had the most profuse hemorrhage he had seen in years, the blood filling three or four vessels. He dilated the cervix under general anesthesia. The cervix was closed, not dilated at all and it did not seem that anything could come away except blood. He found a large amount of placental tissue but could not find any fetus at all. The miscarriage was at the third month estimating according to her last menstrual period. The very profuse hemorrhage came on suddenly only after a slight show the previous night.

DR. GEO. W. KOSMAK, referring to Dr. Brodhead's first case, said that very often malignant growths in the ovary could not be diagnosed by their symptoms and in most cases the diagnosis was not made until the pathological report of the excised ovary was received. In one of his cases what was believed to be a cystic ovary was removed during the course of a laparotomy and the subsequent pathological examination showed it to be carcinomatous. The patient had been under observation for almost two years and no recurrence had been noted. It has been claimed that in every instance where malignant disease of one ovary is present, the other one should be simultaneously removed, even if not apparently involved. Dr. Kosmak believed that in view of his experience he would hesitate to follow this procedure.

DR. HOWARD C. TAYLOR believed that in such cases, especially where the woman was anxious to have children, she would prefer to take the risk and not sacrifice the other ovary.

EARLY RESULT IN A CASE OF CARCINOMA OF THE CERVIX UTERI— PRESENTATION OF PATIENT AND SPECIMEN.

DR. JAMES A. CORSCADEN reported this case and presented the patient and specimen. The Chairman appointed Dr. Wells and Taylor a committee of two to examine and report upon the case, *q.v.*

DISCUSSION.

DR. F. C. HOLDEN said that many years ago he had the pleasure and privilege of being one of Dr. John Byrne's house surgeons, and he like all the others who associated with Dr. Byrne and his work became very enthusiastic about it. He was wholly in accord of the recent writing of Dr. Boldt to the effect that the only advantage the Percy method had over that of Byrne was in that the abdomen was opened by the former. Dr. Byrne labored under many disadvantages in that his work was done in the preaseptic age when the opening of the abdomen was of a great deal more magnitude than it is to-day. He was of a very inventive turn of mind and the instruments and battery used by him were of his own design. The battery was of a liquid type and it was necessary to constantly agitate the fluid while it was being used to insure sufficient heat. Dr. Byrne never used a bright red heat on either the cautery knife or dome but always worked with a dull red heat. Had he lived one or two

decades later, Dr. Byrne would have made some very valuable additions to his original work.

At the Greenpoint Hospital they recently had a case of extensive carcinoma of the cervix which seemed suitable for the Percy operation. Both tubes and ovaries were removed and both the internal iliac arteries ligated with heavy silk ligatures. This was followed by long slow cautery application as advised by Percy. When this case was examined two weeks postoperative it was discovered that there was still some carcinoma tissue remaining. Four weeks after the first operation the abdomen was again opened and it was interesting to note that the iliac arteries were still closed completely below the ligated points. Again slow cautery application was made, and up to the present time this patient has shown a decided improvement in general condition.

Dr. Byrne's work was very frequently followed by extensive hemorrhage at the time the separation of the slough, and Dr. Holden felt that inasmuch as the abdomen is opened in conjunction with the Percy method it is advisable always to ligate the internal iliac.

DR. HERMANN J. BOLDT said that he knew nothing that was superior to the treatment devised by Byrne and he believed that all the credit for this method of treatment of cancer of the uterus was due to Byrne. Percy had given them a method—by opening the abdomen—which enabled them, however, to make use of a more thorough procedure. That was true, but to claims of superiority of the low-grade over the high-grade heat was, in his opinion, a myth. The high grade of heat would penetrate as far as the low grade. When one used the degree of heat Byrne did, the work could be done more rapidly and it was as safe as the low degree of heat, if the abdomen was opened, so that the electrode could be controlled.

REPORT OF THE COMMITTEE APPOINTED BY THE CHAIRMAN TO EXAMINE THE PATIENT PRESENTED BY DR. CORSCADEN.

DR. HOWARD C. TAYLOR said that the results of the operation to him seemed to be very good. The circular scar was present and the parts were soft with no induration. On the finger after examination was found a slight amount of blood, showing that probably there was a return of the disease. He felt that if they could always get as good a result in these cases as in the one he just examined, the operation would be a very valuable one. The Percy operation differed from the Byrne operation only in that he opened the abdomen and in the degree of heat employed. Both Byrne and Percy laid great stress upon employing a low grade of heat. Outside of the mere opening the abdomen Dr. Taylor did not think the method of Percy differed from that of Byrne.

DR. FREDERICK C. HOLDEN asked Dr. Taylor what he would do with such a case now.

DR. TAYLOR replied that he would let her alone.

DR. BROOKS H. WELLS, the other member of the Committee appointed by the Chairman to examine the woman and report, said

that the patient had a rather smooth funnel-shaped vagina. At the upper end of the vagina about the small scar was a small area of infiltration which gave the impression that the carcinoma was still making progress. As a palliative measure the operation had been successful. The question came up, What were they going to do with these patients who began to bleed again? He thought that in the patient just examined the bleeding would come back in two or three months. In these inoperable cases Dr. Wells had found acetone applied after Gellhorn's method gave great relief, stopping the bleeding, controlling the sepsis and odor, so that the patients improved greatly, gaining in color and strength which lasted a long time.

DR. GEORGE H. MALLETT said that there were three methods of treating these cases, first, open the abdomen and do as Percy did and apply the heat again; second, use radium; and third, the application of the x-ray. By any of these methods the terminal stage might be postponed, the patients have months or years of comfort. Remarkable statistics had been given following the use of radium in these cases.

DR. CORSCADEN said that the result of Dr. Taylor's examination showed the condition of the woman to be practically the same as it was three weeks after the operation. Whether the condition had really changed very much he was unable to say. She had been given x-ray exposures to the abdomen for the glands, and whether these had anything to do with keeping it quiescent or not, he did not know. He was waiting for any sign of increase in growth before undertaking further steps.

DR. FREDK. W. BANCROFT read a paper on

REPORT OF A CASE OF CARCINOMA UTERI TREATED ACCORDING TO THE
PERCY METHOD.*

THE RADICAL ABDOMINAL OPERATION FOR CARCINOMA OF THE UTERUS.

DR. HOWARD C. TAYLOR read this paper. He said that if they excepted certain superficial growths of a low degree of malignancy, there was no cure for cancer which was accepted by the profession other than its complete removal by surgical means. Though there had been promising results from the use of other agents such as radium, x-rays and the cautery, these results were not such that their use would be advised for a limited growth in a patient constitutionally suited for an operation for its removal. Personally he believed there was a distinct value in the use of radium, x-rays and the cautery in cancer of the uterus. The use of them was still experimental and sufficient time had not yet elapsed to prove the permanency of the results reported from their use. The number of the cases treated by these agents that would remain cured beyond the five-year limit was uncertain and until more definite clinical statistics were available, the use of them would be largely limited to the

* For original article see page 11.

inoperable cases, and the earlier cases would be treated by some surgical operation for the removal of the growth. The surgical removal of cancer was a mode of treatment about which they had definite knowledge, and it was not to be abandoned until they had something that was certainly better with which to replace it. There was no doubt that the use of radium and x-rays had modified the selection of cases suitable for operation. The abdominal route rather than the vaginal was the first choice of most operators. There were certain cases, however, that were approached more easily through the vagina than through the abdomen on account of the size of the vagina and the thickness of the abdominal wall. A fat abdominal wall adds greatly to the difficulty of any abdominal operation and in a contraindication for a radical abdominal hysterectomy. If there was a combination of thick abdominal wall and a wide vagina with a prolapsed uterus, the vaginal route should be selected. Personally he preferred the abdominal route for all cases except those equal in which there was a fat abdominal wall and a wide vagina.

Dr. Taylor asked what was the difference between a simple and radical abdominal hysterectomy for carcinoma of the uterus. Theoretically there was a great difference, practically one merged into the other. In one operation vessels were ligated close to the uterus and no attempt was made to remove any of the pelvic connective tissue; in the other operation the ureters were exposed, the vessels were ligated outside of the ureters close to the pelvic wall and a large amount of pelvic connective tissue and a large portion of the vagina were removed. In favorable cases the theoretical radical abdominal hysterectomy could be performed and a large amount of pelvic connective tissue and the vagina removed. This added greatly to the chances of a permanent cure of the case. There was no doubt, however, that any series of radical abdominal hysterectomies contained cases that did not differ in the amount of tissue removed from a series of simple hysterectomies by the same operator. The extent of the operation performed for the removal of any malignant growth was limited by two factors, the risk to the life and the amount of mutilation of the patient. In the radical operation there was a distinct risk to the patient. It was a more extensive operation requiring more time, complication during and after the operation were more frequent, and a higher primary mortality was a necessary result.

The higher primary mortality of the radical operation was not due entirely to the operation itself. For a simple hysterectomy the growth must practically be limited to the uterus itself, while a considerable involvement of the broad ligaments was not an absolute contraindication to the radical operation. For growths of the same extent in patients in whom the radical operation was not contraindicated because of constitutional disease or a thick abdominal wall, Dr. Taylor believed that the primary operative risk was only moderately greater for the radical than for the simple hysterectomy and was not sufficient to outweigh the advantages of the more extended operation. After the ureters had been isolated the radical

operation could often be done with little more difficulty than a simple hysterectomy. In his own cases the primary mortality was about 15 per cent. He believed the mortality would be less in the future with a more careful selection of cases. The injuries to the ureters are accidental division, ligation and sloughing. He did not believe that the ureters were accidentally divided or ligated as frequently in the radical as in the simple hysterectomy, and it was surely discovered in the former and might not be in the latter. Sloughing or necrosis of the ureters was an accident of the radical operation which never occurred in a simple hysterectomy. In a series of 500 cases of Wertheim's there was sloughing of the ureters in thirty cases; in five it occurred in both ureters. The most frequent result of this accident was a ureterovaginal fistula. The cause of the necrosis of the ureter in most cases was the interference with the blood supply during the operation. Injuries to the bladder more frequently follow the radical than the simple hysterectomy. Paralysis of the bladder requiring catheterization was of frequent occurrence after the radical operation. Kidney infection frequently followed bladder infection, and injection was favored by the condition of the ureters. To the same extent that the lesions of the bladder and ureter were more frequent in the extended operation, the real complications would be more common. Bleeding most frequently occurred from the radical operation and might be exceedingly difficult to control. The ligation of the anterior trunk of the internal iliac arteries would diminish the amount of the hemorrhage. It was probable that the risk of infection was no greater in the radical than in the simple hysterectomy for a carcinoma of the cervix uteri of the same extent.

As to the results, statistical and theoretical evidence favored the radical operation. From the European clinics large series of cases were reported showing a much higher percentage of permanent cures than had been obtained by any other operation. The more extensive an operation for a malignant growth, the greater were the chances of a permanent cure if the patient survived the operation. This was true of cancer in the uterus as in other organs.

In conclusion Dr. Taylor said that his treatment of carcinoma of the cervix uteri was as follows: (1) For the favorable cases, a patient in a good general condition, an abdominal wall without an excess of fat, and no associated pelvic lesion to increase the operative risk and a limited growth, he advised the radical operation. (2) For a limited growth in a patient who was a bad risk on account of general or local conditions, he advised usually a simple abdominal hysterectomy, occasionally a vaginal hysterectomy. (3) For the so-called inoperable case, he advised radium, x-rays and the cautery. In this class because of the favorable reports that were published following the use of radium, x-rays and the cautery, he included cases that formerly he submitted to operation. If after the use of radium, x-rays or the cautery the case became operable he removed the uterus.

DISCUSSION ON THE PAPERS OF DRs. BANCROFT AND TAYLOR.

DR. GEORGE H. MALLET said that he was very much interested in hearing the report of Dr. Bancroft's case of death following the application of heat by the Percy method, and also was very glad to hear Dr. Taylor's presentation of the treatment of carcinoma of the cervix. One of the strong points in favor of the Percy operation is its low primary mortality; but since life insurance companies figure an average of 2 per cent. mortality for all abdominal operations, it is not surprising that a death will sometimes follow this procedure in the most skilful hands.

Thirty years ago heat was the only operative means used in the treatment of carcinoma of the cervix. In 1882 Pawlik reported 136 cases operated upon by Braun with an operative mortality of 7 per cent. and 9 per cent. of cures.

In 1885 Baker of Boston reported to the American Gynecological Society that he had amputated the cervix in three cases of carcinoma with the galvanic ecraseur and ten years later reported that two of these were still alive. In 1892 Byrne reported eighty-one cases where the whole cervix was involved, and upon whom he had operated with heat. There was no mortality. Of these thirty-one were lost sight of. Eighteen lived over five years. Considering all of the thirty-one lost to have died in less than five years after the operation, he would still have 20 per cent. of cures. Of the cases treated by radical hysterectomy Wertheim had an operative mortality of 19 per cent., Reiss, whom Dr. Taylor mentioned, had 30 per cent., while one of the most prominent operators in this country lost 40 per cent. of his first twenty cases. In a paper read by Thomas Wilson before the Clinical Congress in London last year, in speaking of the difficulties of the radical operation, he stated that the results of the first ten cases operated upon should not be counted against an operator as he was only gaining the necessary experience.

In 1897 Dr. Mallett assisted Dr. Byrne in his operation upon a patient at the General Memorial Hospital. He used his battery and instruments as described by Dr. Holden. The operation required about two hours for its performance. On the third night following, this patient had a profuse hemorrhage, and required uterine and vaginal packing; however she had no reaction and went out in good condition. Thirteen years later this patient was still living. Percy had placed this operation upon a more scientific basis. Opening the abdomen was of distinct advantage, because it permitted the operator to control the heat when applied to the uterus. Ligation of the blood-vessels of the pelvic organs was also an important feature; because it produced a "stivation" of the growth as advocated by Dawbarn and prevented secondary hemorrhages.

In many of Dr. Mallett's cases in addition to the heating, radium was used but not as a routine. The cases referred to the cancer hospitals are almost without exception inoperable and are sent there either to die or for palliation of their symptoms, namely; hemorrhage, profuse fetid discharge and pain. Formerly, these cases

were treated with the actual cautery, acetone, gauze packing, morphine and their relief was of very short duration and an effort was made to get them out of the hospital while they were yet able to go. Since using this method of applying heat the results had been much more satisfactory. They all stood the operation remarkably well. There was little or no shock and scarcely any pain, and without exception they had the appearance the day after the operation of having had a minor operation performed. Dr. Mallett had performed this operation twenty-three times. There had been no operative mortality and with very few exceptions, the relief of symptoms while temporary had been enough to justify the operation.

When he started this work, in his enthusiasm he used it in some unsuitable cases; as, in two patients with recurrences after hysterectomies had been performed. At that time he did not know that Dr. Percy had advised against this and had devised a special operation for this class of cases. Two cases were operated upon by this method where the primary growth was in the anterior wall of the vagina and bladder. It is needless to say that the results in these cases were not satisfactory.

He has one case under observation that was sent to the hospital by a prominent surgeon as inoperable. She was operated upon by this method sixteen months ago. She is now absolutely free from all symptoms. The uterus is not much larger than one's thumb and is freely movable. In another case after this operation, although she was considered inoperable, she has been free from all symptoms for nine and a half months. Radium was also used after this operation. In another case after the heating and radium were used she had a recurrence after eleven and a half months. After recurrences, Dr. Mallett had opened the abdomen and performed the operation a second time in one case and had applied the heat in another without opening the abdomen again. These operations were too recent to note the results.

It would be a wonderful thing, and he hoped that it would be proved to be true, as claimed by Percy, that the heated iron would kill the cancer cells within a radius of from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches. Balfour of Mayo's clinic has stated that in sixteen cases where the heat had been used and the uteri removed one month later that in thirteen of these there were found no live cancer cells. That report was certainly encouraging. However, we are not yet ready to cast aside all other operative procedures, especially when we can combine the use of radium and x-ray with them.

Dr. Mallett said that he was glad that Dr. Taylor had emphasized the severity of the radical operation and had mentioned the complications that often accompanied it.

DR. CORSCADEN said that the treatment of these cases should be excision of the uterus; they not only hoped to get the gross mass out but the microscopical cells as well. When the tumor reached the stage where it could not be so excised, then any method which would improve the patient was justifiable. There were two factors to be considered, namely, the local and the general effect upon the growth;

whether the heat applied was of high degree or of low degree, and whether the heat in the instrument would reach further in one method than in the other, this was a matter of exact observation. What had been shown was interesting in that both pathological processes were presented, of first the greater susceptibility of muscle and, second, the greater susceptibility of carcinoma.

Another factor that had not been talked upon enough was general immunity; this was one factor that had been proven by direct experiments upon animals, experimental cancer in rats. Murphy had shown what a great factor the lymphocytes were in immunity.

Another factor was the fact that whatever serum therapy was used, or synthetic chemical, there was always a high body temperature. Just what produced it as yet they could not tell. They remembered the equanimity with which some of the surgeons viewed certain infections in carcinoma, and especially after operations upon the breast. Some stated that they would rather have an infected wound than one that was clean. He referred to Coley's work with the streptococci of erysipelas.

Percy's treatment he believed to be very much indicated in these cases, but he was not ready as yet to say that this treatment afforded better results than did radium. It produced a leukocytosis and raised the body temperature. There was not only a local leukocytosis but a general leukocytosis. The polymorphonuclears and the number of lymphocytes were greatly raised at the same time. Radiotherapy was often of great value in these cases.

DR. BROOKS H. WELLS said it was difficult for him to criticise the very admirable paper of Dr. Taylor because Dr. Taylor's experience was, as related in his paper, practically identical with his own. The tendency during the past decade had been to restrict the indications for the radical operation. If the disease was found in the early stage, when one felt reasonably sure he could remove it entirely by the radical operation, the radical operation should always be done and one would get most satisfactory results. On the other hand, if the disease had progressed to a point where it could not be entirely removed, the question would arise whether the radical operation should be attempted at all. The question of operation at the extremes was easy to decide; in the intermediate case the decision might be difficult. In advanced cases the cautery followed by either the x-ray or radium often gave excellent palliative results, while incomplete surgical removal often led to more rapid spread of the disease. In doubtful cases the decision should lean toward the radical procedure, for we all occasionally saw cases go on to permanent cure after demonstrably incomplete removal of the cancer. It was widely realized that a certain amount of immunity was produced in these cases and the speaker was in hopes that we would soon be taught more about this immunity and how it was produced. Eighteen years ago he had operated upon a patient for the removal of a carcinomatous uterus. Examination of the tissues removed showed that carcinomatous cells extended beyond the cut edges. This patient was well to-day and was an example of a number of such

cases that he had seen. Instances such as these make us realize the importance of this immunity and should carry a certain weight in the decision for or against operation. However, when all was said, the most important life-saving factor in all cases of cancer was early recognition, and about this there was yet much to be learned and taught.

DR. HERMANN J. BOLDT said that only last week he operated upon a patient who had been sent to him two weeks ago by a surgeon well known to them all, who said the patient would be entirely well in one week. This patient subsequently saw Dr. Brettauer who told her that he was in no position to make a diagnosis until an excision had been made and a piece of the tissue submitted for examination. Two days after she came to see Dr. Boldt and he told her the same as did Dr. Brettauer. Neither of them knew that the other had seen this patient. She finally consented to have a piece removed for diagnostic purposes. She had a well-marked adenocarcinoma. He did not make careful rectovaginoabdominal examination until attempting a radical operation. He then found that the patient was practically inoperable. But bearing in mind the fact that one did not know when carcinoma was fit for a radical operation or not, he opened the abdomen and did some extensive intraabdominal work and verified what Dr. Brettauer and he had believed existed. The diagnosis might have been made earlier.

Apropos of the radical operation, he thought that Dr. Taylor had struck the keynote in what he had said regarding simple hysterectomy and radical operation. Nineteen out of twenty cases done now and called radical operation were nothing more than simple hysterectomies. To do this work thoroughly was not a simple matter at all; it was a difficult operation. They had not yet had sufficient experience with it. Dr. Boldt went even further than Dr. Mallett who said the first ten cases should not be counted against the man; twenty-five cases should not be counted against him. It was a dangerous and difficult piece of work. Laying bare the ureters was not so difficult, but on freeing them to the bladder, the difficulty commences. Free venous bleeding occurred occasionally. Dr. Taylor was correct in saying that there was one class of cases in which the vaginal operation was to be preferred, cases with extreme obesity. If he had to deal with a very obese woman he did not care to try the abdominal route. The methods to be employed in these cases should be studied further and they must have more experience in order to enable them to do the operation properly.

In regard to the destruction of the carcinomatous tissue by the cautery, Dr. Mallett had stated that if they could destroy the cells from 1 or 2 inches away from the site of the application of the cautery, the results would be excellent, but he used the word "if." Whether they used the high degree of heat or the low degree the carcinomatous cells were destroyed but a short distance from the cautery.

Tying the blood-vessels was a method which the late Dr. Pryor advocated for the relief of the symptoms, bleeding and lessening the

discharge and making the patient more comfortable. The cautery operation he believed to be one of the best, the most valuable therapeutic agent that they possessed, for the palliative treatment.

So far as radium was concerned he did not hesitate to say, judging from reports, that it was of the utmost value. Unquestionably much more could be achieved with the use of radium than many of them believed. Many patients who were considered inoperable became operable by the use of this agent, as reported by men of unquestionable veracity.

DR. WILLIAM S. STONE said that he had had the opportunity of observing some of Dr. Mallett's work with the Percy operation. In one case, which he had examined several months after the operation had been performed, there were no gross evidences of carcinoma in the pelvis. He had also seen Dr. Percy himself perform two operations, in both of which, through the courtesy of Dr. Mallett, he had the opportunity of making an examination immediately before and after the operation, and that he was much impressed with the immediate result of this procedure. In one case, for example, in which the left broad ligament was extensively involved, rendering the uterus immovable, this thickening and hardening at the completion of the operation had almost completely disappeared, and the uterus moved more freely. The truth is that it is a desiccating process, taking the water away from the tissues and reducing the bulk of tumor tissue. The examination of these patients immediately after operation might lead one to think that they were then suitable for the radical operation. But he was also impressed with the fact that the operation was not a minor affair. As with the radical operation one should hesitate very much before attempting it, unless he has a comprehensive knowledge of the extension of the disease and all the conditions which make it applicable. To be safe and efficient, it required an operator who was well acquainted with the disease and the technic. Dr. Stone expressed his enthusiasm for the possibilities of the use of radium, especially in cases of carcinoma of the corpus uteri, but thought that the so-called Percy operation offered an additional therapeutic resource in certain advanced cases, in which neither the radical operation nor radium could be applied.

DR. HAROLD C. BAILEY said that when the carcinoma was well beyond the broad ligament, Percy's operation would not result in success. The operation, however, was distinctly palliative.

DR. EMILY DUNNING BARRINGER said that the use of the cystoscope was very valuable in helping to clear up some of the borderland problems. In certain cases of uterine carcinoma, the growth progressed forward into the bladder region out of all proportion to the parametrial involvement. If these cases had a preliminary cystoscopy they would probably be considered inoperable and become a factor in reducing postoperative mortality. The bleeding that occurred from the bladder had interested her very much. She questioned whether this might not be due to a rupture of a varicose vein in the bladder wall. In certain cases even if there be no definite carcinoma

of the bladder there may be a very large varicose vein in the bladder mucosa due to pressure of the adherent carcinoma. The manipulation necessary in removing the growth may have stirred up such a varicosity and started the hemorrhage. Owing to a possible pressure of the growth on the ureters in cases of uterine carcinoma, Dr. Barringer suggested that a preliminary phenosulphonaphthalein test might be of value in estimating a possible case of postoperative renal insufficiency. She asked Dr. Taylor if any of his postoperative mortality was due to this cause.

DR. TAYLOR closed the discussion. In answer to Dr. Barringer's inquiry he said he could not recall an instance among his cases in which death was caused by renal insufficiency. He thought that her suggestion regarding rupture of varicosities in the bladder causing the hemorrhage was correct in the case he reported; at least it was a reasonable one.

With regard to the mortality following the Percy operation, a case that Percy himself did at the Womans' Hospital some two or three years ago died. Percy acknowledged that there was a definite mortality accompanying his operation.

It might be better to give the credit of this operation to Byrne; the part added by Percy was that of opening the abdomen enabling one to do more thorough work. The late Dr. Pryor was the first to suggest and to ligate the blood-vessels.

In regard to the treatment of carcinoma of the cervix in general an operation was practically the only means of cure, and radium, the x-ray and the cautery of only palliative value.

The mortality of the operation should not be questioned too much. If in one series of cases there was a 10 per cent. risk considered and a 10 per cent. cure, and in another series of cases treated by a different method there was a 40 per cent. risk and a 40 per cent. cure, any of them would prefer the 40 per cent. risk with its 40 per cent. cure.

BRIEF OF CURRENT LITERATURE.

Histological and Physiopathological Experiments on the Internal Secretion of the Pancreas in Pregnancy.—A. Falco (*Ann. di Ostet. e gin.*, Jan. 31, 1916) gives a careful résumé of the previous experiments made with reference to the internal secretion of the pancreas, details the experiments made by him on pregnant women, and gives his conclusions. The islands of Langerhans in pregnancy present to histological examination a diminution of their activity. Total pancreatectomy in guinea-pigs during or at the end of pregnancy does not cause glycosuria, but on the contrary causes all the other symptoms of pancreatic diabetes. This absence of glycosuria seems not to be caused by the internal secretion of the fetal pancreas; it appears to be the effect of either the utilization of sugar on the part of the fetus or the presence in the maternal blood of a placental

ferment. Experiments executed with injection or ingestion of placental pulp would seem to show that the placenta has a large part in the metabolism of carbohydrates.

Postpartum Care of the Perineum.—Plass (Johns Hopkins Hospital *Bulletin*, April, 1916) describes the technic employed in the maternity wards of the Johns Hopkins Hospital, in which all irrigation of the perineum with antiseptic solutions is omitted. Two groups of cases were compared, in one of which the usual routine treatment was employed and in the other simple cleansing with tap water and soap and a wash cloth by the patient herself when possible. In both groups the morbidity was practically the same. In another series in which perineorrhaphy was done, better results attended the cases in which no antiseptic irrigations were employed, a greater number of satisfactory healings taking place in the latter class. The author concludes that macroscopic cleanliness alone gives better results than the use of antiseptic solutions and also effects a considerable saving of time.

The Time of Conception.—Siegel (*Deutsche med. Wchnschr.*, 1915, No. 42) presents a study based on observations made in 100 pregnant women in which the day of an isolated intercourse could be determined. This was rendered possible by the conditions resulting during the war. The author believes that conception can only take place during the first twenty-one days after the last period and that the most susceptible time is before the sixth day. In no case could conception be established after the twenty-first day, so that he thinks it is safe to say that the postmenstrual period is the most favorable time for fertilization. During the premenstrual period it is probable that the swelling of the mucous membrane interferes with the process. It is also assumed that the follicles rupture between the seventh and fourteenth day after the beginning of menstruation. The spermatozoa require from one to two days to reach the ovary and rapidly perish in the peritoneal cavity. The author assumes therefore that successful conception takes place about two days after coitus.

Organic Extracts as Oxytoxics.—Köhler (*Zentralbl. f. Gynäk.*, 1915, No. 51) has made a series of observations on pregnant women in whom the injected extracts of thyroid, mammary gland, thymus, pancreas, ovary, corpus luteum, testes, placenta, and intestinal mucosa were employed. A series of thirty cases were subjected to the experiments all of which were in the first stage of labor with less than two fingers' dilatation of the cervix. In nineteen cases the women were at term and in seven less than five months. There were also several cases of abortion. It would appear from these experiments that all the organic extracts exert practically the same effect and that labor pains are accelerated with few exceptions by all of these extracts. The author believes moreover that the pituitary preparations are not any more effective than those which he employed. In the majority of cases the pains appeared within ten minutes and gradually became more severe and regular. In cases where they ceased after an interval they could be readily

renewed by further injection. In no case were more than three administrations necessary before labor occurred. In four instances an operative delivery was necessary for various reasons unconnected with the administration of the drug. In the cases in which a negative effect resulted it is probable that an individual idiosyncrasy was present such as has been observed after the injection of pituitary preparations. In none of the cases were the children effected nor were any abnormalities noted after labor.

Labor in Young Girls.—Specht (*Zentralbl. f. Gynäk.*, 1916, No. 3) presents an extended study based on the material of Stoeckel's Clinic at Kiel among which there were eighty-one primiparæ of less than sixteen years of age in a total of 10,350 labors (0.78 per cent.). He found that the menstruation in these young mothers appeared earlier than usual, that the development of the pelvis seemed to be in advance of that associated with this early age and that the length and weight of the children increased with the age of the mother, the male infants being very much larger than the females. Among the favorable factors associated with pregnancy in these young girls were the less frequent disturbances of pregnancy, shorter labor, infrequent peritoneal lacerations, lessened hemorrhage, a lower fetal morbidity and likewise a lessened maternal morbidity and mortality in the puerperium. Among the unfavorable features in this class of cases he found a more frequent occurrence of eclampsia, breech presentations, uterine inertia, and premature labor. It seems, therefore, in agreement with other reports that labor in young girls is as a general thing of a favorable character and although some disadvantages exist in comparison with older primiparæ, these are outweighed by the favorable features already referred to.

Extra-and Transperitoneal Cesarean Section.—Baisch (*Zentralbl. f. Gynäk.*, 1915, No. 44) as the result of his personal observations in a series of thirty-two cases in which the transperitoneal cervical Cesarean section was done believes that the operation is less dangerous and more successful than the extraperitoneal procedure. The author believes that the good results are due to the simplicity of the operation in which the uterus is approached through the suprasymphyseal incision and opened in the middle line low down to above the upper border of the bladder. The wound in the uterus and abdomen is closed without drainage.

Megacolon as an Obstruction to Labor.—Jaschke (*Zentralbl. f. Gynäk.*, 1915, No. 43) reports a case in which a Cesarean section was found necessary because of the presence of a pelvic tumor which was diagnosed as an incarcerated cervical myoma that had also resulted in constipation. On opening the abdomen the uterus was found displaced to one side and the greater portion of the abdominal cavity occupied by an enormously enlarged colon, the lower portion of which simulated the pelvic tumor previously diagnosed. The intestinal wall was thick and hard, and the cavity seemed to be filled with gas and large hard and soft fecal masses. An enormous stool was obtained on the fourth day but on the sixth day a collapse

suddenly occurred and the patient died. At autopsy the extent of the enlarged colon was confirmed and the entire mucous membrane was covered with ulcers. The author believes that the case was one of megacolon of which the occurrence associated with pregnancy is most unusual. Whether this condition was congenital or acquired could not be determined.

Menstrual Symptoms during Pregnancy.—Pok (*Gynäk. Rundschau*, vol. x, Nos. 3 and 4, 1916) presents his series of observations made on six cases in which apparently normal periods occurred during the first four months of pregnancy. The writer believes that this condition is due to the hyperemia in the domain of the uterine and pelvic veins which appears regularly at monthly intervals and leads to a congestion with increase of blood pressure in the vessels. This finally results at a point of lessened resistance in the appearance of hemorrhage which persists as long as the hyperemia remains. In the cases referred to by the author cervical erosions seemed to be the source of the bleeding. This phenomenon is not true menstruation and although regular, disappears in the later months of pregnancy. The subjective symptoms of pregnancy may therefore be interfered with until the appearance of the fetal movements. In certain cases marked hemorrhages of this kind may lead to abortion or premature labor.

Organic Extracts in the Treatment of Amenorrhea.—Köhler (*Zentralbl. f. Gynäk.*, 1915, No. 38) employed a series of extracts of organs which do not apparently bear any relation to the genitals in the belief that the effect of the same was not specific in character, but that it depended on a common chemical basis present in the extracts of all the organs. The effect on patients presenting an amenorrhea was stated to be favorable and the author is inclined to the belief that the contained amino group in these organic extracts is responsible for the effect.

Saprophytic Organisms as the Cause of Purulent Vaginitis.—Hoehne (*Zentralbl. f. Gynäk.*, 1916, No. 1) refers to the assumed harmless character of the *trichomonas* in the vagina and reports a series of cases in which purulent conditions were undoubtedly due to the presence of these organisms, all others being excluded. In this series of twelve cases both in nonpregnant and pregnant women the characteristic discharge was thin, profuse, foamy, and of a yellowish color, which invariably produced extensive irritation of the surrounding skin. Small ulcers and warty growths frequently result. Gonococci were never found in these cases, but the *trichomonas vaginalis* was invariably demonstrated in about 30 per cent. of both pregnant and nonpregnant women out of a series of over 200 examined. The diagnosis depends on the finding of the organisms in the moist preparation, for if allowed to dry the characteristic appearance is lost. The examination is best made with a trace of the fresh secretion in a drop of physiological salt solution, when the movements of the cilia can readily be seen.

GYNECOLOGY AND ABDOMINAL SURGERY.

Retroflexion of the Uterus.—A. Falco (*Ann. di ost. e gin.*, Dec., 1915) discusses the causation of retroflexion of the uterus, its symptoms, and treatment. He gives the causes as loss of tone of the uterus, and relaxation of the round ligaments. If retroflexion occurs in pregnancy it is due to an abnormality of the function of the uterine muscle, assisted by the relations of the various organs contained in the pelvis, and lesions of the parametrium, especially the vesico-uterine ligaments. The author does not admit that the round ligament allows the uterus to fall backward. It should draw the uterus forward. If it cannot do this, it is because it is stretched and relaxed. Another group of retroflexions are due not to inflammation or puerperal conditions, but may be called primary. They are produced by conditions which cause relaxation of the uterus and all its ligaments. Another set of cases result from congenital deformities of the uterus. There may be congenital shortening of the anterior vaginal wall. The symptoms of retroflexion are disturbances of the menstrual function, menorrhagia and metrorrhagia, due to the obstruction to the flow of blood past the flexion and the consequent congestion. Pain is a frequent symptom. Metritis accompanies the retroflexion. Pain is present in the lumbar region, with a sensation of weight in the pelvis. The author does not believe that every case of retroflexion demands operation. A considerable number of these patients may be relieved by the use of a well-fitting pessary. If operation is to be done, shortening the round ligaments plays an important part, and is satisfactory. The author does not believe that the Adams-Alexander operation predisposes to abortion or premature labor. Of thirty women operated upon by this method in the clinic of the author only three had recurrence of the displacement.

Treatment of Acute Gonorrheal Tube Infections.—R. C. Coffey (*Surg., Gyn. and Obst.*, 1916, xxii, 228) holds free drainage to be the most important thing in the treatment of gonorrhea. It is quite possible that a much larger percentage of tubes infected with gonorrhea may be saved and restored to normal function if seen early and treated surgically with a large protected quarantine pack, which at once gives free drainage and prevents the peritoneal surfaces from surrounding and sealing up the tubes during the first active inflammation, than can be done by the so-called but misnamed conservative treatment. The quarantine pack used after removal of gonorrheal pus tubes makes the operation just as safe in the acute stage as during the interval, and saves the patients much suffering and many complications such as destruction of the ovaries, connecting the abscess with the rectum or bladder, and the formation of troublesome adhesions, as well as minimizing the chances of a chronic incurable discharge from the uterus. The quarantine pack is placed as follows: On opening the abdomen the fluid and spilled pus is sponged out with dry gauze. The intestines are packed entirely out of the pelvis. The entire pelvis is exposed to direct view by the use of malleable retractors. If the tubes are firmly sealed they are removed by exci-

sion down to the uterine mucosa with any infected portion of the ovary, leaving the healthy portion to be healed as a result of the drainage. The retractors are held in place and gauze wicks the size of a finger (not folded like the folds of a fan) are laid straight side by side entirely across the abdomen, putting sometimes twenty or thirty of these wicks, reaching to the bottom of the pelvis and gradually extending up the side of the pelvis, making a solid wall of gauze. After these wicks have been placed carefully a sheet of gutta-percha tissue of four or six layers is placed above the gauze, care being taken that the tissue goes entirely across the lower part of the cavity, absolutely shutting off all possibility of contact of the intestines with the gauze drainage. If the tubes are not sealed, the quarantine is placed without removing them. The open ends of the tubes are left in contact with the gauze. The wicks and the rubber tissue in certain cases are then turned toward the patient's face, exposing the uterus and bladder, and another folded sheet of six or eight layers of gutta-percha tissue is carefully inserted between the gauze and the fundus of the uterus, this practically surrounding the gauze and making a completely protected pad. This second gutta-percha sheet should not prevent the open tubes from coming in contact with the gauze. In just six full days after the pack is placed, the wicks are withdrawn, leaving the rubber tissue. On the fourteenth day the rubber tissue is removed, and according to the case a small rubber tube which is tapered at the point is inserted, or drainage is omitted. It usually takes such wounds about five weeks to heal. For four weeks the patient is kept in bed, preferably on the back most of the time.

Chronic Urethritis in Women.—W. F. Shallenberger (*Jour. A. M. A.*, 1916, lxvi, 1011) urges that the female urethra be given more attention as the possible seat of trouble, especially in cases of obscure pelvic pain, and emphasizes the importance of chronic urethritis as the cause of symptoms in many cases in which it has often been overlooked. He suggests nerve-blocking of the urethra in intractable cases, not only for the relief that may possibly be given, but also as a means of diagnosis, for, if we get cessation of pain by blocking off the urethra, we can be reasonably certain that it is the seat of the trouble. It could likewise be used to lessen the pain in cystoscopic examinations in patients in whom the urethra was sensitive and tender. He infiltrates the paraurethral tissue with a solution of novocain, 0.3 per cent., with quinine and urea hydrochloride, 0.5 per cent.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY.

Twenty-eighth Annual Meeting, Held at Washington, D. C., May 8, 9, 10, 1916.

The President, ROWLAND G. FREEMAN, M. D., of New York, in the Chair.

PRESIDENTIAL ADDRESS.

DR. ROWLAND GODFREY FREEMAN, New York City.—“There is an agent of wonderful power and value to the pediatrician, the use and action of which is little appreciated, fresh air. By fresh air as a therapeutic agent we mean moving and cool out-of-door air. The air of the still, hot, humid dog day of summer is little better than that of the crowded, hot room in winter. Fresh, moving, cool, out-of-door air stimulates the appetite, induces quiet sleep, brings color to the cheeks, and increases the resistance of the organism to infection. In seeking an explanation of the action of fresh air on the human body we find the claim that fresh, cold air raises materially the blood pressure. This claim, however, has not been confirmed by subsequent investigations, and we seem driven to the position that the favorable action of fresh air on the organism is due to the absence of the deteriorating effects of closed rooms. In the fresh air the body has the advantage of normal conditions, while any modification of this furnishes increasingly serious results from air stagnation. The idea that air which has been breathed by other people is unhealthy probably arises from the unpleasant odor of closed and crowded rooms, and from symptoms elicited by extremes of this sort. The symptoms produced by closed places are depression, headache, thirst and difficult breathing. The elements producing these results were supposed to be a diminution of the oxygen and an increase of the carbon dioxide, with the possible appearance in such an atmosphere of a really poisonous product from the expired air. Experiments, however, have for the most part discredited this theory. The amount of oxygen in crowded, closed rooms is not depleted to a danger point, nor is the amount of carbon dioxide increased to such a point. Efforts to find a poisonous element in such air have been made from time to time with negative results. In

1883, Hermans of the Hygienic Institute in Amsterdam, concluded that the discomfort of crowded places was due to inability of the body to cool itself in a hot, moist atmosphere. These symptoms then are due to stagnant, hot, moist air surrounding the body, and will be accentuated in people wearing heavy, impervious clothing that prevents access of moving air to the skin. It is evident then that we should wear as little clothing as is consistent with comfort. The result of these elaborate observations is, in brief, that fresh air is good, not because it supplies oxygen, not because it is not overloaded by carbon dioxide, not because it contains no poisonous element, but because it allows the body to exist under such circumstances that it can control its moisture and temperature. In the application of these newly developed facts to our daily work in pediatrics we have to combat the traditional fear of drafts and the habit of many people of living in close, hot rooms. It is only by the brilliant results obtained in certain diseases, notably tuberculosis and pneumonia, by the use of fresh air, that we are able oftentimes to obtain the fresh air for our children which they need for the preservation of health and their proper development. I believe that the cold air of winter is much more stimulating and produces better results in children than the mild air of spring and autumn. The best results from fresh air are obtained by keeping the children out of doors day and night. Many of our pediatricians have confused fresh air with cold air. Out-of-door sleeping porches enclosed on three sides and roofed, but open to the south, furnish the best fresh air at night, while in the daytime balconies and rooms without heat and windows wide open supply the air we need. It is evidently not enough, however, that we should have this fresh air, but we should also look to the clothing to see that our children are not sealed in heavy, impervious covering so that the skin is unable to rid itself of the heat and moisture. Where it is impossible to obtain such complete out-of-door exposure, the best substitute in cold weather has seemed to me to be in rooms with cheese-cloth screens in the windows. They allow a moderate access of air without the presence of drafts. Other methods of ventilation consist in patent ventilators put under the lower sash. It is only during the existence of marked changes of temperature between indoors and outdoors that epidemics of colds exist, for during the summer we have practically an immunity to colds and they only occur when our houses are closed. In New York our epidemics of colds usually begin in November and December.

"Premature infants who show a subnormal temperature in cool air should be kept in an air temperature that will preserve the normal body temperature. This warm air must be a freely moving, warm air, rather than the dead air found at the bottom of a box. I am not sure whether such cold, fresh-air treatment is applicable to cases with kidney lesions or with severe heart lesions. The most important application of this fresh-air treatment is to build up the vitality and resistance to disease of frail children. I believe that rachitis is entirely a disease of housing. It exists, not in tropical countries

where people live out-of-doors but in colder climates where people house themselves in winter. The symptoms develop in winter only and the severe cases that we see are entirely confined to the children of races that have been accustomed to warm climates where the families do not house themselves in winter. Italians and colored people and other people accustomed to tropical climates should be warned that they must give their children fresh air in winter if they would have them survive and develop properly. In all the acute infectious diseases I think there is now a general acceptance of the advantage of fresh air, excepting perhaps in measles and scarlet fever. In tuberculosis and in pneumonia there is no question of its advantage.

"It would seem that some explanation is due as to why, if all these statements are true, children are still housed and many adults have a panic if a breath of cold air strikes the back of their neck or their bald heads, while children who are brought up without fear of cold enjoy it wherever it strikes. The supposed production of catarrhal inflammations in adults by exposure to cold air, if it really exists, exists only on account of suggestion. These people have been brought up to such a fear of fresh air that every infection of the upper air passages to which they succumb they attribute to this health-giving influence. It is sincerely to be hoped that many of the coming generation may be brought up under different ideas and may be less dependent on hot, offensive, stagnant air for the supposed comforts of life. There is evidence enough to show that many diseases are favorably influenced by this simple and safe measure. Why don't you use it? Some are afraid, some won't take the trouble. Many children are allowed to become sick from housing and children may be seen dying in closed wards of many of our best hospitals who might have been saved had they been put out-of-doors."

RECENT PROGRESS IN OUR KNOWLEDGE OF THE PHYSIOLOGICAL ACTION OF ATMOSPHERIC CONDITIONS.

DR. FREDERIC S. LEE, New York.—"Two weeks ago to-day, in the physiological laboratory of the Columbia School of Medicine, Dr. Eastman and I made experiments the results of which have changed our ideas concerning the physiological action of atmospheric conditions. It had long been the custom to ascribe to chemical components of the atmosphere the bad effects of living in air that had already been breathed by human beings. The discovery of oxygen and carbon dioxide early in the last century gave a great stimulus to this motion, and it became firmly fixed in the minds of chemists, physiologists and physicians, as well as the educated masses, that air that had once been breathed was chemically vitiated and rendered unfit for human use by the lack of oxygen, the accumulation of carbon dioxide, and the presence of an organic poison of unknown nature. No sooner had this notion become widely accepted than the laboratories began to demonstrate the inadequacy of the supposed proof of the notion. To cut a long story short, we

now know that, except under very unusual circumstances, the harmfulness of respired air is not due to its chemical components. The harmfulness of living in confined air is found in certain physical rather than chemical features—the air is too warm, too moist, and too still; and if it has not these physical features it is not harmful. We all have sat in crowded assemblies, we all have experienced the hot, humid, still days of an American summer. We all know the effects of such air on our sensations. In what respect is hot, humid, still air harmful? To answer this question we must consult the records of many researches, chiefly on human beings, but partly on animals, that have been undertaken since Hermance, more than thirty years ago, observed that in crowded theaters and churches his own bodily temperature rose. The most recent of these researches is that of the New York State Commission on Ventilation, which has been in progress for the past two and a half years and is not yet completed. Notwithstanding that man is supposed to be a homothermal organism, there is a certain relationship between his bodily temperature and the temperature of his environment, even under the ordinary conditions of living. This has been shown by the New York Commission, which found that during the months of June and July the rectal temperature of its subjects at 8 A. M., living in their own homes, was conditioned by the average atmospheric temperature of the previous night. The variation of the bodily temperature was about 1° F. for 20° F. of atmospheric temperature, although it is probable that the degree of variation can be modified by the clothing. The Commission further found that, whatever the bodily temperature of its subjects might be, it was lowered by confinement in an atmosphere of 68° F. and 50 per cent. relative humidity, and raised by confinement at 75° F. with the same humidity, or still more by 86° F. with 80 per cent. humidity. The final average bodily temperature in a certain series of observations, where the subjects were confined in the observation chamber for from four to seven hours were:

68° F. (20.0° C.) 50 per cent. humidity.....	98.0° F. (36.7° C.)
75° F. (23.9° C.) 50 per cent. humidity.....	98.5° F. (36.9° C.)
86° F. (30.0° C.) 80 per cent. humidity.....	99.3° F. (37.4° C.)

Haldane and others have shown a greater elevation of bodily temperature in more extreme atmospheric conditions, and have pointed out the accompanying dangers of heat stroke. The relation between bodily temperature and external cold has not been so fully studied, but enough is known to warrant the statement that, in normal individuals at least, the bodily temperature can be to a considerable degree controlled by controlling the temperature and the humidity of the surrounding air. It is altogether probable that the same is largely due to febrile diseases. External temperature exerts likewise a definite effect on the circulatory system. The rate of the heart beat is increased in warm, humid, and decreased in cool, dry air. The New York Commission found the average rate of its subjects confined in an atmosphere of 86° F. and 80 per cent. relative

humidity to be 74, and in an atmosphere of 86° F. and 50 per cent. humidity 66. Eastman and I have seen the pulse rate increase by 39—from 67 to 106—as the temperature of the air surrounding the subject rose from 74 to 110° F. and the humidity from 58 to 90 per cent. The important and involved topic of the relation of atmospheric conditions to blood pressure I must leave until the abundant data that have been accumulated by the New York Commission have been subjected to a more careful examination than has as yet been possible. Atmospheric conditions exert on the respiratory system effects of various kinds. On the rate of respiration a moderate degree of heat and humidity seems to be without effect, but there is some evidence that more extreme conditions cause a quickening of the breathing, and this is probably accompanied by more shallow respirations. The more extreme conditions too appear to result in a lowered concentration of carbon dioxide in the air of the pulmonary alveoli, although I cannot yet quote figures to demonstrate this. The matter is, however, important, since a lowered carbon dioxide signifies an increased content of hydrogen ions, in other words increased acidity in the blood. Eastman and I are now investigating this point with much interest. The mucous membrane of the respiratory tract is markedly affected by atmospheric conditions. Exposure to heat causes increased swelling, redness and secretion in the nasal mucosa, and these effects are more marked when the humidity of the air is high. Exposure to cold reverses the effects. Little can be said at present regarding the action of atmospheric conditions on the nervous system. The New York Commission has expended much time and effort in endeavors to detect a possible influence of atmospheric variations between moderate limits on the ability to do mental work. The subjects were given such psychical tests as cancelling arithmetic figures, adding figures, mentally multiplying three-place by three-place figures, typewriting, and more complex mental performances which involve choice and judgment. The range of atmospheric variation was from a lower limit of 68° F. and 50 per cent. relative humidity, and the upper limit of 86° F. and 80 per cent. humidity. In some cases the air was kept quiet, in others by motion by electric fans. In neither the young men nor the young women subjects of these tests could there be detected any relation between atmospheric conditions and either the accuracy or the amount of mental work that was performed. The relation between atmospheric conditions and metabolic phenomena is not yet elucidated. A topic that is inviting is the possible relationship between atmospheric conditions and bacterial infections. Most of the experimental observations that have here been made relate especially to the action of temperature on the course of infections, and it has generally been found that high external temperature with accompanying pronounced increase of bodily temperature checks the progress of infections that are already existing. Somewhat lower temperatures (30° F.—35° F.) on the other hand, seem to favor the multiplication of the bacteria and the advance of the disease."

SOME STUDIES ON THE MODE OF INFECTION IN PYELITIS OF INFANCY.

DR. RICHARD M. SMITH, Boston.—“There have been two antagonistic theories to explain the mode of infection of the kidney in pyelitis of infancy; one maintains that infection takes place through urethra, bladder and ureters; the other that the infection comes by means of the blood and lymphatics. Before discussing the relative merits of these two theories it might be observed that the disease is much more common in female than in male infants, the proportion being nearly three to one. The organism most frequently causing the disease is the colon bacillus, the percentage varying from 50 to 90 per cent. Directly against the ascending theory of infection are the facts that colon bacilli have never been shown to pass up the normal unobstructed ureter and that the colon and tubercle bacilli have been introduced repeatedly into the bladder and in the presence of a normal mucous membrane were excreted without causing damage of any kind. Ascending infection occurs only in the presence of obstruction to the outflow of urine and cannot occur if the sphincter of the ureter is normal. The theory of kidney infection by the blood and lymphatics rests upon much surer ground. The work of Thiel and Embleton seems to show that bacteria may pass to the kidney by the lymphatics alone, appearing first in the fat capsule and being distributed through the kidney. If bacteria appear in the urine, that is if they have passed through the kidney, they must have reached the kidney by the blood stream. This latter procedure is what occurs in pyelitis so that there must be a blood infection. The direct sympathetic connection between the colon and the right kidney, which is the kidney most frequently affected in unilateral infection, had led some writers to believe that bacteria pass directly from the intestine to the kidney by these lymphatic vessels. This probably occurs and gives rise to infected kidney but not to pyelitis as we see it in infants. Pyelitis may follow this condition by secondary blood infection. The usual mode of infection in pyelitis is somewhat as follows: From the intestinal tract or some other source bacteria get into the lymphatics and then into the blood or possibly directly into the blood. They are transferred by the blood to the kidney. They may pass out of the body through the kidney without doing any harm or they may set up an infection at their point of excretion. They may during their passage through the kidney cause more or less damage to the various portions of the organ. An infection of the kidney may take place by an extension inward from the pelvis, probably by lymphatic channels. The blood infection in nearly all the acute infectious diseases is so well known that no proof is needed for its support. The colon bacillus has been found in the blood by several investigators. The blood infection was always early in the disease disappearing later as in typhoid fever. The infection of the pelvis of the kidney from within, that is by bacteria brought to it by the blood and excreted seemed established and satisfied all the conditions except in offering an explanation for the greater frequency of the disease in females. This explanation

is not hard to find for no mention has been made of a very important source of lymphatic and blood infection of the kidneys, namely, the pelvic organs. The lymphatic vessels draining the pelvic organs are connected by free anastomosis with the kidneys. These vessels drain through the thoracic duct into the blood. The female genital organs with the close proximity to the urethra, vulva, vagina, rectum, and the semiclosed character of the parts offers every advantage for the entrance and growth of colon bacilli and other bacteria.

"I have made seventy-one cultures from the vagina, vulva and urethra of forty infants and young children. One infant six hours old and all over eighteen hours, except one infant six days old and all showed growth from vaginal culture. All the vulvar and urethral cultures were positive. The first organisms to appear were streptococci and staphylococci and then small bacilli, not colon. Colon bacilli were found in vaginal cultures of infants as early as the fifth day. My findings are in accord with those of Schmidgall who found the vagina of new-borns sterile ten out of thirteen times and by the second day a profuse growth of cocci. The colon was isolated twelve times out of twenty-one in new-borns after the second day. She showed also that the vaginal secretions did not kill off the pathogenic organisms. A possible source of infection with colon bacilli or other bacteria is certainly present in the female vulva, urethra and vagina and a slight trauma may easily accomplish the entrance of organisms into the lymphatic vessels and blood and thus to the kidney. The source of infection in pyelitis, in the majority of instances, males and females together, is the gastrointestinal tract. Some cases may arise from infection in the skin, teeth or tonsils, or in some local septic process. Many cases in females, accounting for the greater number in this sex as compared with the males, may arise from bacteria entering the blood often via the lymphatics from the urethra, vulva, or vagina."

DIET AND GROWTH IN INFANTILE SCURVY.

DR. ALFRED F. HESS presented this study, in which he called attention to the fact that scurvy almost never developed among breast-fed babies, but was encountered among those who were fed on cow's milk and more especially those who received in addition some of the proprietary foods which were so commonly resorted to in the preparation of milk formulæ. There had been considerable difference of opinion as to whether pasteurized milk could induce the scorbutic condition. In its report, in 1912, the Commission on Milk Standards stated that pasteurization did not destroy the chemical constituents of milk and that it was not altered by exposure to heat under 145° F. for thirty minutes. In order to test the validity of this statement Dr. Hess made a test among a certain number of inmates of an infant's home, where all babies were fed on Grade A pasteurized milk which had been heated to 145° F. for thirty minutes. The babies had been receiving orange juice in addition which was discontinued. No other change in the diet was made. Almost all

the babies who did not receive orange juice developed a more or less marked form of scurvy, whereas those who continued to receive orange juice remained entirely free from this disorder. Most of these infants had been in the institution from birth so that their condition both before and subsequent to the change could be thoroughly observed. The results of this investigation were published some two years ago and were questioned by some who were loathe to believe that pasteurized milk could in any way lead to scurvy and hence the observations were extended somewhat during the subsequent year. The results were the same, so the writer feels safe in saying that a diet of pasteurized milk leads to the production of scurvy in infants unless some antiscorbutic food is also given. The scurvy met with in infants fed on pasteurized milk was, as a rule, not of the florid type met with in infants fed for months on a proprietary food, but might be described as latent or rudimentary. There was a gradually increasing pallor, a failure to gain in weight, the development of some petechial hemorrhages, and in more marked instances, the subperiosteal hemorrhages. It would seem probable that this insidious type of the disorder was far more common than was generally recognized by physicians and that there were many infants suffering from slight nutritional disturbances which might be ascribed to this cause. When the pasteurized milk was replaced by raw milk the scorbutic condition improved, although it might be added that raw cow's milk was by no means comparable to orange juice as an antiscorbutic. It is not to be inferred from these conclusions that the use of pasteurized milk is fraught with danger, but merely that it is an incomplete diet for babies and must be given with antiscorbutic food. There are also secondary factors contributing to the development of scurvy, such as the individual variation depending upon hereditary characteristics, that is upon the amount of antiscorbutic material which the infant brings with it when it comes into the world. Secondary food factors also seemed to play a part. Malt preparation seemingly predisposes to scurvy and it seems that there is an intimate relationship between the development of scurvy and the amount of carbohydrate in the dietary. The sovereign cure for scurvy is orange juice, which is efficacious even when boiled for ten minutes; potato, one of the best antiscorbutics for adults, may be used in infant feeding where orange juice cannot be readily obtained. For this purpose milk can be diluted with potato water, one tablespoonful of mashed potato to 1 pint of water, instead of the usual cereal decoction. In connection with this work observations were carried out to ascertain the effect of infantile scurvy on growth. This study embraced an interval of one year or more. Three periods might be distinguished in this investigation: a preliminary period of about three months, during which time the infants were weighed daily and measured every two weeks; a period embracing four months during which time the infants received a liberal diet of pasteurized milk and cereal, which differed from the previous period only in the fact that no orange juice was given; and an after period, lasting about six months, which

dated from the time when orange juice or some other antiscorbutic was again added to the food. During the period when the antiscorbutic was discontinued particular attention was given to furnishing a sufficient quantity of food, and more cereal was given or the strength of the milk mixture was increased. It was found that although the infants continued to gain in most instances for a few weeks following the discontinuance of the orange juice, they soon reached a stationary plane and for months were unable to rise above this level, but increased in weight promptly when the antiscorbutic food was again added to their diet. It is very probable that infants cease to gain in weight at about eight months of age, during the third quarter of the first year of life for the want of this essential addition to their food, and fail to progress until mixed feeding is begun some months later. At present the rule may be said to be to add fruit juices to the infant's diet at about the sixth month, but it would seem that it should be given as soon as possible. There is no reason why a baby should not receive orange juice when a month old, and there are strong arguments in favor of such a procedure.

A number of infants in this group were also measured and as a result it was found that scurvy not only had a direct effect upon the weight but also upon the growth in length. This fact was of greater biologic interest than failure to gain in weight, for growth in length is a physiological impulse to which the individual clings with great tenacity, and it is rarely affected even when other functions are held in abeyance. Lack of growth, however, did not always play an essential part in the constitution of scurvy. Orange juice was found to be a corrective for the lack of growth as well as for the failure to gain in weight in this series of cases.

DISCUSSION.

DR. L. EMMETT HOLT, New York.—“For several years past it has seemed to me that scurvy has been on the increase and during the last year this impression has been confirmed. We all realize the advantages of pasteurized milk but it has certain disadvantages which we should recognize. It is time that we as pediatricians express our disapproval of the present tendency of health boards to require the pasteurization of all milk. Such a course would be a mistake; it should not be made impossible to get pure, adequately certified raw milk. In considering the subject of scurvy we must take into consideration the fact that other factors beside pasteurized milk play a part. We must give due weight to the factor of hereditary predisposition. After all there are comparatively few cases of scurvy due to pasteurized milk among the poor because it is quite customary for them to give fruit and vegetables and other foods to babies at a comparatively early age. Ten or twelve years ago nearly all the cases of scurvy could be traced to proprietary foods and now they nearly all come from boiled milk. The number of cases is undoubtedly increasing or we would not be having this discussion.

Physicians should be prepared to recognize scurvy when it comes under their observation. During the past year I have seen four cases that were not recognized until epiphyseal separation had taken place. We must emphasize the fact that if pasteurized milk is used we must also use an antiscorbutic and use it early and continually."

DR. CHARLES HERRMAN of New York said: "Dr. Hess has said that orange juice retains its antiscorbutic properties even when boiled while milk does not. This raises the question whether something more than heat may not enter into the problem."

DR. SAMUEL S. ADAMS of Washington, D. C., said: "All know that I am opposed to the commercial pasteurization of milk, and I hope the Society will take this question up and protect against the tendency to pasteurize all milk. The commercial pasteurization of milk is dangerous. Within the last ten days four cases of scurvy due to pasteurized milk furnished by the City of Washington, have come under my observation. In one instance I asked a dairyman to send raw milk. He did not do it and I asked him why. He said because the raw milk was bad. It would be quite as reasonable to buy a rotten steak because the butcher tells us it will not hurt us if it is cooked as it is to buy dirty milk and think it is all right because it has been heated. I am not opposed to the home pasteurization of milk."

DR. A. D. BLACKADER, Montreal.—"I would like to emphasize the importance of pasteurized milk as a cause of infantile scurvy. I have had two instances in infants in which the symptoms were obscure, chiefly scurvous symptoms, associated with a lack of growth but there were none of the classical symptoms of scurvy. In both of these cases there was a rapid disappearance of the symptoms immediately following the administration of orange juice. When I saw these cases I thought I had found something new, but I will give Dr. Hess credit for having shown that this subacute form of scurvy is due to a deficiency of vitamins in the food of these young infants."

DR. HENRY L. K. SHAW, Albany.—"I am in a position to see the reports of the various milk-borne epidemics which have occurred as a result of the use of raw milk in New York State. There have been seventeen epidemics directly traceable to milk. Septic sore throat and not tuberculous is the dangerous disease conveyed by raw milk. In one of these epidemics there were seventy cases of septic sore throat. Some cases of this infection have been very serious and even fatal, and I think that a comparison of the evidence would show that the danger of scurvy is not comparable to that of septic sore throat. Scurvy is a disease very easily cured or prevented by the use of orange juice which can be safely added to the infant's diet after the third month."

DR. PERCIVAL J. EATON, Pittsburgh.—"I want to support the statements that Dr. Hess had made. Commercially pasteurized milk is not what one would really call pasteurized milk. Commercial pasteurized milk is milk that had been subjected to superheated steam at a pressure of 15 pounds and this is really sterilized milk.

When one uses properly sterilized milk much better results are obtained than with the commercial product. The best method is to get properly certified milk and to sterilize or pasteurize it at home.

DR. SAMUEL McC. HAMILL, Philadelphia.—Dr. Hess has not said anything against pasteurized milk, he has said that pasteurized milk is a necessity to-day. I do not think it is necessary to come to the defense of properly pasteurized milk. But there is a tendency toward requiring the pasteurization of all milk and if this was done one could no longer get good raw milk, hence it seems that we should take some action. The medical profession is largely to blame for the attitude of health officers and dairymen; they are not prepared to give good certified milk. There is also some confusion as to just what good pasteurized milk means, and in any action taken by this Society it should be definitely stated what pasteurized milk means. I believe in the pasteurization of milk because we know that, while pasteurization to-day is frequently unsatisfactory, it is done in a better way than formerly. In Philadelphia in most instances it is done efficiently. The dangers of pasteurized milk are not to be compared with those of raw milk. Scurvy is a disease that is easily controlled and cannot be compared with the diseases that are milk borne."

DR. HENRY HEIMAN, New York.—"We should have laws to govern the commercial pasteurization of milk. There is no way to tell whether we are getting pasteurized or sterilized milk. The probability is that when the mother gets pasteurized milk she gives it another pasteurization. One can give 5 drops of orange juice to a baby at the age of one month and other fruit juices as well, such as pineapple; this will furnish the missing link."

DR. PHILIP VAN INGEN, New York.—"In connection with the emphasis that has been placed on the increase of scurvy since the introduction of pasteurized milk mention should also be made of the decrease in the infant death rate that has taken place as a result of the use of pasteurized milk."

DR. MAYNARD LADD, Boston.—"I have seen a half dozen cases of scurvy in babies presumably taking raw milk and found that the milk had been overheated at the time it was warmed for feeding, so that these children were practically getting pasteurized milk."

DR. HESS, in closing the discussion, said: "I feel that the conclusion could not be drawn from his paper that pasteurized milk is not advantageous. The only conclusion that can be drawn is that pasteurized milk is not a complete food and all that is necessary to make it a complete food is to give orange juice or potato water, but not the potato water made from commercial potato flour. There is also a predisposition to scurvy which must be taken into consideration. Under the same conditions some develop scurvy and some do not, just as in beriberi, some get it and some under like conditions do not. As to whether an infant develops scurvy may depend on the mother and what food she has taken during pregnancy. Dr. Heiman has asked why boiling destroys the vitamins in milk and not in orange juice. That seems to depend on the medium in which

the boiling takes place. The vitamins are not destroyed by boiling in water but are in fats such as the fats contained in milk. I had a control series which were fed orange juice and none of them developed scurvy. In the children that developed scurvy the feeding of raw milk produced a sharp reaction and an increase in weight.

"As to what a vitamin is, Dr. Funk has isolated them from various food stuffs; they are nitrogenous substances. The term is good as indicating the essential part they play in growth and nutrition.

"As to the vitality and general condition of the children upon whom our conclusions are based, these children have been under our care in most instances from birth and the environment is good. These children compared very favorably in every respect with normal healthy children elsewhere."

SARCOMA OF THE KIDNEY TREATED BY X-RAY.

DR. ALFRED FRIEDLANDER, Cincinnati.—"It is generally accepted as axiomatic that the only hope in cases of sarcoma of the kidney in childhood lies in early nephrectomy. Even with this procedure the mortality is very high on account of the likelihood of metastases, even in those cases in which the operation itself is well borne.

This child, four years of age, was admitted to the pediatric service of the Cincinnati General Hospital on October 20, 1915. The history was one of increasing languor and lassitude, with loss of appetite and anemia. Except for the condition of the abdomen the physical findings were not of moment. The entire left abdomen was filled by a tumor, extending from the costal margin in the nipple line to 3 cm. above the symphysis. The tumor extended 1 cm. to the left of the umbilicus. It was hard, distinctly nodular, apparently not tender to pressure, and could be moved forward by pressure from behind. Urinalysis on admission showed distinct microscopic hematuria. The blood showed a secondary anemia. Fluoroscopic examination with the colon partly filled with gas showed a sharply defined dark shadow in the region normally occupied by the kidney. The x-ray plate of the lungs for the characteristic metastatic sarcomatous shadows was negative. X-ray treatments were given because of the apparent hopelessness of the case. These were given with the Coolidge tube on the front, back, and side of the tumor at each treatment, twenty treatments being given at intervals of about a week. The dosage was graduated, beginning with a treatment lasting ten seconds at a distance of 8 inches and a spark gap of 9 inches and increased to fifty seconds at a distance of 8 inches and a spark gap of 9 inches. Before each x-ray treatment the child was given full doses of potassium citrate for a day. There was no toxemia nor increase of the blood in the urine. After the seventh treatment it was noticed that the tumor had decreased very markedly in size. Later the child had an attack of influenza and then one of measles and death occurred. Autopsy showed sarcoma of the left kidney with small metastases in both lungs and in the liver.

"The pathologist's report was presented which stated that the stained sections showed the most widespread and generally diffuse necrotic changes with no evidence of inflammatory reaction. Even the stroma showed degenerative changes, associated with irregular areas of edema. The parenchyma was almost completely necrotic and showed almost no evidence of structure. In the areas in which some tumor structure persisted the appearances were those of alveolar sarcoma, and in these areas short spindle cells and round cells were present, chiefly the latter. The fact that the whole necrotic process was so widespread in so large a tumor mass; that there was no evidence of vascular thrombosis in the main vessels, and no evidence of infarction; and the fact that the degenerative process appeared to be a gradually progressive one indicated that the x-ray treatments were at least partially the cause of retrogression. This was a particularly unfavorable case and it seemed justifiable to say that if nephrectomy was contraindicated in a case of sarcoma of the kidney the x-ray should be given a thorough trial."

TRANSIENT ABDOMINAL TUMOR IN A CHILD OF FIVE YEARS, WITH
REDUNDANT COLON.

DR. EDGAR P. COPELAND, Washington, D. C.—"The complaint in this case was the periodic occurrence of an abdominal tumor and the brief history is as follows: The patient was the only child of young and healthy parents. The child was delivered by instruments after a tedious labor. The infant was normally nourished until two days after birth, when a promising lactation for some reason failed. After this the child ran the gauntlet of proprietary foods which was continued well into the second year. He sat up at five months, began the eruption of teeth at eight months and walked at nineteen months. With the exception of frequent attacks of rhinitis the boy escaped all the diseases peculiar to childhood, progressing in a fairly normal manner to the age of three and one-half years. His present illness began in December, 1914, approximately a year before my first examination; he became suddenly ill in the night, with extreme nausea, severe vomiting and the appearance of a rounded tumor in the hypogastrium, simulating a distended bladder. To judge from the description, the vomiting was simply bile-stained gastric juice, and at no time stercoraceous. The tumor was elastic, but not specially tender to touch. There was no history of previous disturbance in the regularity of the bowel. There was no fever. The physician called in at this time made a diagnosis of intussusception and had completed plans for an immediate removal of the patient to the hospital for operation. Returning a few hours later he was much surprised to that the mass had spontaneously disappeared and the patient recovered. Since this initial appearance, these attacks have occurred at varying intervals, seldom less than three weeks and on several occasions as long as six weeks apart. They have varied in the severity of associated symptoms and likewise in duration, seldom lasting over two days. The tumor has invariably

appeared first over the region of the bladder, moved about the abdomen spontaneously and finally disappeared. Its appearance had always been associated with nausea and vomiting, and its disappearance with a pronounced paroxysm of abdominal pain.

"At the time of my first examination, I found the patient in bed lying on his back, thighs partially flexed. The attack was several hours old and there was still some nausea. Presenting in the hypogastrium was a smooth rounded tumor about the size of an orange, elastic but not tender to the touch, and dull on percussion. It was palpable by rectal examination and suggested strongly a distended bladder. It was possible, without undue force, to manipulate the tumor about the entire abdomen. There was a fairly well pronounced beading of the ribs. The pulse was rapid but regular. The temperature was normal. The leukocyte count was 11,500. The von Pirquet and Wassermann tests were negative. Under restricted feeding and large enemata slowly administered, the mass spontaneously disappeared. An examination of the abdomen subsequently was absolutely negative.

"The clinical history, in the light of the x-ray findings, would seem to justify the assumption that the phantom tumor is the result of a temporary kinking of the redundant colon (or sigmoid), incident to its displacement to the right which is followed by either fecal or gaseous distention in the loop. When the loop fills itself to a certain point, it swings gradually to the left and automatically unkinks itself with a disappearance of the tumor mass."

REVIEW.

NERVOUS CHILDREN. By BEVERLY R. TUCKER, M. D. Professor of Neurology and Psychiatry, Medical College of Virginia; Consulting Physician of the Juvenile Court, Richmond, Virginia; Physician of the Tucker Sanatorium; Neurologist to the City Hospital; Consulting Neurologist to the State Epileptic Colony, etc. Small 8vo. Illustrated. pp. 147. Boston: Richard G. Badger. Toronto: The Clark Co., Ltd., 1916.

This little book is attractively written and simply expressed. It aims to give its readers a clear understanding of the fundamental principles underlying the rearing of children from the standpoint of their nervous and psychic development, in the hope that this knowledge will enable the physician, the teacher, the mother, the nurse, not only to understand the normal as well as the nervous child, but to train it to avoid the neuropsychopathic pitfalls which are found everywhere along its path.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Eiweissmilch and its Adjuvants.—E. Glanzman (*Jahrbuch. f. Kinderheil.*, Oct., 1915) says that the value of "eiweissmilch" depends on the presence of soapy stools. There are several groups of cases of this nature. In one group these stools occur with the presence of a large amount of alkaline earths and alkalis in the intestine, giving a dry, shiny stool. A disturbance of the metabolic balance takes place and there is a reduction in weight. Soapy stools are the cardinal symptom of disturbed metabolism. In one group of cases which show disturbed metabolism the addition of carbohydrates to the diet without any change in the concentration of the food will put an end to the soapy stools. In a second group the carbohydrates produce no improvement for presence of too much fat is another factor. The fat produces a strongly alkaline secretion of the intestinal walls and the large glands. We must seek to hinder fermentation of the carbohydrates by reducing the amount of whey. By reducing the whey the amount of fat is well borne though whey alone never causes soapy stools. Casein is another factor in the production of the soapy stool. In buttermilk we have, with a high concentration of whey, also a high relative and absolute amount of casein, which may lessen the stimulative fermentative influence of the whey. With increased concentration of the milk in a feeding mixture the influence of casein to prevent fermentation is increased over the ferment-stimulating whey. In an albumin-rich medium the fat tolerance rises in spite of the contained whey. From buttermilk enriched with cream is but a step to full milk. Constipation with soapy stools may occur under this diet. The high concentration of the casein is the cause of the constipation. In adding rennet to milk there is a splitting of casein into albumin whey and paracasein. When this precipitates large amounts of calcium phosphates are carried down with the fat. These paracasein calcium combinations act as catalyzers in the production of earthy alkaline phosphate fat soaps. A similar action takes place through an addition of inorganic calcium solution. An increase of albumin acts like an increase of fats. It causes an increase of alkaline albumin-rich intestinal juice. This medium nourishes a proteolytic flora and does not allow of the growth of fermentation bacteria. The fermentation is prevented by putrefaction of the intestinal juice. In another group of cases the soapy stools are prevented by reducing fat and albumin at the same time, and using malt-soup, which contains but one-third milk. The soapy stool is the usual result of strongly alkaline reaction in the intestine. The alkaline reaction arises first from the reduction of the carbohydrates (milk sugar); second, from the reduction of the whey; third, from an enriching with freshly prepared casein which prevents a primary fermentation of the carbohydrates; fourth, by reduction of whey. Eiweissmilch fulfils all the requirements. The different

forms of disturbance found in these children are merely steps in one and the same process, beginning with disturbances of metabolism and ending in decomposition and alimentary intoxication. We must get these cases in an early stage of the disturbances, when we can easily cure them. Eiweissmilch is the best means we have for treating these cases after human milk. By its use we may cure the child without a reduction of fats and carbohydrates which would be dangerous to life. The value of "eiweissmilch" is that it so soon and so surely establishes a tolerance for carbohydrates without reduction of fats. By the use of "eiweissmilch" we produce a change in metabolism, and by adding carbohydrates we cure it. To stop the decomposition as soon as possible is the central problem. We add sugar up to 5 or 6 per cent., and if necessary a cereal. This acts as a palliative only to assist the "eiweissmilch" in establishing a true balance. Indications for the use of "eiweissmilch" are dyspepsia, decomposition, alimentary intoxication, infections causing disturbances of nutrition, intolerance of carbohydrates, disturbances from constitutional conditions, exudative diathesis, neuropathic, psychopathic and spasmophilic cases. In all forms of fermentation diarrheas "eiweissmilch" is indicated. It should never form a permanent diet and should not be given to normal children. Individualization of cases and physiological knowledge are necessary to its successful use.

Acute Otitis Media in Infancy and Childhood.—W. R. P. Emerson (*Bost. Med. and Surg. Jour.*, 1915, clxxiii, 616) records five cases to represent the most common types of aural complication. In none of the five were there symptoms of earache. In two cases the symptoms were all abdominal, in one meningeal, and in two general, associated with fever. In all of these cases the diagnosis of acute otitis media was made by routine examination of the ear drums. These cases are used to emphasize the fact that in every case of contagious disease and of affections of the respiratory tract in children, measures should be inaugurated at once to keep the nasopharynx clear and so maintain drainage through the Eustachian tube. In such cases the ear drum should be inspected at every visit of the physician to his patient. An electric ear instrument gives a clear picture of the drum with a minimum disturbance of the child. In cases of otitis media when the symptoms and the local condition do not improve under treatment the drum should be incised without waiting for bulging or pus.

Speech Sign of Congenital Syphilis.—W. B. Swift (*Bost. Med. and Surg. Jour.*, 1915, clxxiii, 619) says that congenital syphilis can cause a faulty or incomplete development of vocal cords that results in vocal monotony and harshness in both conversation and weeping. As spirochetosis has been of late offered to cover all the lesions of syphilis he proposes as a name for this sign scaphoid vocal cords and spirochetotic harshness.

Fetal Rigor Mortis.—Lorenzo Castriota (*Ann. di ostet. e gin.*, Dec., 1915) details a case of stillborn infant which showed at birth distinct rigor mortis. This is a very unusual condition. After a

careful review of the studies which have been made of the cause of rigor mortis the author gives the following explanation of its presence at birth. All the facts given show the relation of rigor mortis to muscular contraction. Possibly cadaveric muscular rigidity may be a phenomenon independent of the nervous system and connected only with the muscles themselves. The contraction may be an exaggeration of the normal muscular tone, and this depends on the continuous action of the nervous system. Brown-Sequard affirmed that the latent life of the nervous system was the cause of rigor mortis. Later researches contradict this opinion. Catabolic products are undoubtedly factors in the postmortem rigidity. There are variations of acidity between the fresh and the rigid muscles.

Clinical Study of Children in Relation to Tuberculous Exposure.—

In a clinical study of 228 children in relation to tuberculous exposure controlled by the cutaneous von Pirquet test, J. B. Manning and H. J. Knott (*Amer. Jour. Dis. Child.*, 1915, x, 354) find that, contrary to the findings of Fishberg, children living in tuberculous *milieu* and those with no known contact with consumptives show marked differences; those living in tuberculous surroundings reacting in ratio of about 2 to 1 of those living in an environment not known to be tuberculous. Further, they find the number of positive reactors in the entire series is only 42.9 per cent. They also find that the number of children between ten and fifteen years reacting positively to the cutaneous tuberculin reaction, in a series in which the majority of the children are from tuberculous homes, is 58.1 per cent., far below the figures of Hamburger, 95 per cent., and von Pirquet, 93 per cent. These discrepancies are due, in their opinion, to community characteristics of climate, housing and sanitation.

Typhoid Fever in Children —Presenting an analysis of 308 cases of typhoid fever in children. K. G. Percy (*Bost. Med. and Surg. Jour.*, 1916, clxxiii, 565) finds that it is a relatively common disease in childhood and far more prevalent in infancy than formerly supposed. Symptomatically it is ushered in very much as in adults, with headaches, fever, malaise and abdominal pain as the most frequent symptoms. In this series and in a large collected series from the literature, the spleen is enlarged in 71 per cent. of all cases; rose spots are seen in 61 per cent.; positive Widal's are seen relatively early in 88.2 per cent.; the white blood count is below 10,000 in 73 per cent.; the fever lasts an average of twenty-five days; relapses occur in 11.8 per cent. intestinal hemorrhages in 4.2 per cent. perforation of intestines in 1.2 per cent., complications in 10.6 per cent., and the mortality is 5.3 per cent. A diet, bland, high caloric, and suited to the individual need of each patient, is most important. Hydrotherapy seems to have a vital place in the treatment of the febrile and delirious stage of the disease. Enemata are essential in a high percentage of cases. Stimulants and other symptomatic drugs are to be used as need arises, for typhoid is a disease, cured not by medicine, but by good nursing and keen, sensible therapy.

Management of Enuresis.—The method of management of enuresis, whether it be diurnal or nocturnal, or both, that has given the

best results in the experience of A. Newlin (*Arch. Pediat.*, 1915, xxxii, 753), consists in the simple procedure of anticipating the involuntary act by a voluntary emptying of the bladder. To be successful, the attendant must devote herself exclusively to the child day and night for the first three or four days. If the enuresis occurs, say, on average of every two hours, she is instructed to put the child on the chamber every hour for the first twelve hours. If she finds the clothing wet at any such time the hour is noted on the chart. At night the child is lifted almost as frequently up to eleven o'clock or midnight; after that every second hour is usually all that is necessary for the first night. On the second day she is guided by her chart of the previous day and may extend the length of time between the voluntary urinations, always, however, anticipating the hours marked as "Wet" on the day before, placing the child on the chamber at least a half hour before the time indicated. Thus in each succeeding day the intervals are longer. Usually in moderately bad cases from the time that the régime is started enuresis ceases entirely and by the end of a week, in at least the milder cases, the child will go from eleven o'clock at night to six in the morning without wetting the bed.

Etiology of Tetany.—Reviewing the literature and describing their metabolic and clinical studies. A. Brown and A. Fletcher (*Amer. Jour. Dis. Child.*, 1915, x, 313) say that tetany may be produced by high carbohydrate foods which have been subjected to heat up to or over the boiling-point. The monthly incidence of tetany is probably due to a disturbance of the gastrointestinal tract (constipation), decreased internal combustion and the comparative safety from diarrhea in feeding high carbohydrate foods during the cold months. A diagnosis of tetany is suggestive when there is manifest kidney inactivity in constipated infants fed heated foods of high carbohydrate content. As a result of this improper feeding there is produced a disturbance of the body salts. At the height of the disease there is an almost complete retention of sodium and potassium (the irritating salts) and a great loss of magnesium. As improvement ensues there is an increased flow of urine accompanied by a relief of the constipation, during which the stored-up sodium and potassium are rapidly lost. This salt disturbance may be remedied first by purgation, second by diuresis, third by the administration of cod-liver oil and phosphorus to build up the calcium content, and fourth by a change of diet. The severe spasms or convulsions may be temporarily relieved by subcutaneous injections of a solution of magnesium sulphate.

Antagonism between the Lactic Acid and the Spore-bearing Organisms in Milk.—W. S. Kiestler (*Johns Hopk. Hosp. Bull.*, 1915, xxvi, 365) finds that heating market milk to temperatures ranging from 55° C. to 65° C. for thirty minutes results in a destruction of many of the lactic acid and intestinal bacteria, and in such samples sporulating bacteria can always be found on the plates poured within twenty-four hours. After this time the lactic acid and the intestinal bacteria become the predominant species in the milk. The

disappearance of the spore-bearers is to be attributed to the growth of the lactic acid organisms in some instances, to *Bacterium welchii* in others, and possibly is due to their combined action. At 67° C. the lactic acid and intestinal bacteria are usually completely destroyed and in milk heated to this temperature the spore-bearing organisms multiply rapidly from the start, but may at times yield to the "gas bacillus" in which case aërobic cultures may be sterile.

The Protection of Infancy during the First Five Months of the European War.—A. Pinard (*Ann. de gyn. et d'obst.*, Nov.-Dec., 1915) says that the Central Office of Assistance for Mothers and Infants arose out of the necessity for protecting infant life in a time of war, when many women found themselves pregnant against their will, and were liable to attempt to sacrifice their infants. Its object is to give to every woman pregnant or having an infant under three months old social, medical and legal protection. Delegates were installed in eleven "mairies" of Paris where such mothers would be found. These delegates were furnished with lists of the places where relief could be given. The first obstacle that was encountered was the small number of milk cattle that were to be had in the neighborhood of Paris, from which milk for the artificially fed infants could be had. The result was a severe epidemic of diarrhea in August and September. Hence there arose the necessity of giving to every mother encouragement to nurse her child. To every wife of a soldier was given daily a sum sufficient to buy food for each child. During these five months of war 3876 illegitimate infants were registered at the "mairies" in Paris. These women had no claim on military assistance because they were unmarried. Many of them found themselves in the street without means of livelihood. In 1914 a law was promulgated to assist such women. This took care of 5743 children during five months of war. Another assistance came by the "secours de chômage," which aided women whose husbands had been killed in the war, or lost in any way, giving to the head of a family 60 francs a year for each child over thirteen months of age. The medical protection consisted in all day clinics at all the maternity hospitals. In three of these establishments 20,000 consultations with pregnant mothers were given. 12,303 infants were cared for in public maternities. The total births during the same period were 16,579, therefore 74 per cent. were under public care. All these mothers were able to nurse their infants. The author considers the mother who cannot nurse her infant as a monster. The "bon de nourrices" allowed the mother to place her child with a wet-nurse at the expense of the state. This is a vicious measure since it allows the mother to leave her child. It has worked untold harm to the infants. Under these measures of assistance the mortality of the mothers has decreased, the number of infants born dead has diminished, and the number of abandoned infants is less. Further assistance should be given to these illegitimate infants by legitimizing them all.

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ORIGINAL COMMUNICATIONS.

THE DUCTLESS GLANDS AND THEIR RELATION TO THE
TREATMENT OF FUNCTIONAL GYNECOLOGICAL
DISEASES.*

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FUNCTIONAL gynecological disorders and their treatment by means of organic extracts, constitute two of the most difficult chapters in gynecic medicine for study and mastery. Up to about ten years ago, our knowledge concerning their pathology and therapy was based chiefly upon speculative reasoning and empiricism. Within the past decade, experimental physiology and biochemistry have blazoned the way toward more accurate, rational and scientific methods of diagnosis and treatment. As clinicians we measure the value of experimental research by the degree of its therapeutic applicability. I might therefore enumerate the different functional disorders and the organic extracts that may be employed in each of them, and consider my task done. Were I, however, to do this, without offering some explanation of the philosophic background that reflects these results, you would be lost in the maze of independent facts, instead of getting a good perspective and being able to see the picture as a whole. To obtain a lasting impression, we will step far enough back, and consider the following points

- I. *What is a Functional Disease?*
- II. *What is Internal Secretion?*

* Read before the Eastern Medical Society. June 11, 1915.

III. *The Physiology and Physiological Pathology of the Gonads and of Some of the Endocrine Glands with Which They are in Close Functional and Chemical Correlation.*

IV. *Ovarian Extracts, and the Functional Diseases in Which They May be Employed with Satisfactory Results.*

V. *Conclusions.*

I. *What is a Functional Disease?*—Nurtured in the school of cellular pathology, we have been taught to classify diseases into organic and into functional. By the former we understand morbid phenomena, which present distinct tissue changes of macro- or microscopic nature. Under the latter heading we group that large class of deviations from the normal which are unaccompanied by structural alterations. Having no concrete pathology, the study of functional diseases has not received as serious consideration as was given to the organic class, and as a consequence their treatment is either empirical, or what is worse, not having been properly diagnosed, therapeutic methods suitable for the latter class, have been applied to the former, with the most disappointing results to both physician and patient.

In the light of modern medicine this nomenclature is no longer tenable. To speak of functional disturbances in the sense that they have no pathology, is erroneous and unscientific. Progressive medicine teaches us daily, that other causes besides pathological tissue changes, may be the etiological factors of disease. Richets, (66) definition of the processes of life, that "the living being is a chemical mechanism and perhaps nothing else," opens before us new vistas of medical thought. May we not assume that the definite pathological metamorphosis observed in organic disease, are in reality the end results of a preceding functional disorder, whose progress has escaped our notice, due to our scientific limitations? Are not the recent studies in cancer drifting toward biochemical disturbances as the cause of malignant growth? We must therefore think of disease in the terms of either morphological or physiochemical pathology.

Modern psychology furnishes an excellent example of the soundness of this assertion. Meyer(43) avers, that "from the point of view of science, behavior and mental activity, even in its implicit or more subjective forms, is not more subjective than the activity of the stomach, or the heart, or blood serum, or cerebrospinal fluid or knee-jerk."

Now then, if psychology ceases to be a puzzle, no longer resisting the objective methods of science, why shall not the functional dis-

turbances, the purely subjective disorders in the genital sphere, be submitted to the same forms of study? Why shall not the modern clinician, like the psychologist, who is adhering closer and closer to psychophysical parallelism, which carries him in his studies of the mind, far beyond what is done in the physiology of the brain, why shall he not, in his studies of sterility, amenorrhea, dysmenorrhea, idiopathic uterine hemorrhage, precocious or delayed sexual maturation, etc., be carried beyond the confines of cellular pathology, into the realms of biochemistry, and there seek solutions for the disorders which have hitherto baffled his antiquated methods of inquiry? These biochemical changes may reside within the generative tract, or in regions remote from it, but to which it is functionally and chemically in close relation.

Functional diseases therefore possess a distinct and definite pathology, just as well as the organic, only of a different nature, structural in the latter instance, and physiochemical in the former; and while morphologic changes are quite readily detected, many of the biochemical alterations are so subtle in nature, that with the present scientific aids at our command some of them still remain unrecognized.

II. *What is Internal Secretion?*—Academically it is of interest to note that Hippocrates, Celcius, and some of their contemporaries have entertained views upon this physiological problem. In 1855 this subject received its scientific impetus from Claude Bernard (6), when he studied the secretions of the liver. He for the first time employed the term "secretion interne." Since then this question has undergone repeated scientific filtrations, its final crystallization however has not been completed as yet. Let us consider its most important theories and facts.

If by internal secretion we mean, as did Novak (57), the interchange of metabolic products between the blood and the tissues on the one hand, and between the tissues and the blood on the other, then we would have to ascribe this property to all the tissues and organs in the body. This would in no way differ from the ordinary intercellular exchange that is constantly going on in the organism. Advanced physiological research demands a more limited definition. By internal secretion we mean the property possessed by a set of special and highly differentiated organs, to produce biologic substances, which when absorbed into the blood in normal amounts, are capable of maintaining the organism at par; but which, when their activity is either diminished or increased, will cause a disturb-

ance in the bodily functions terminating in disease, which will be characteristic of the special gland or glands so involved.

The organs endowed with these properties are grouped under the heading of the "endocrine system." It includes the hypophysis, the pineal gland, the thymus, the thyroid, the parathyroids, the kidneys, the adrenals, the intestinal mucosa, the pancreas, the aortic glands, the uterus, the ovaries, the parovarium, the placenta, the testicles, and the coccygeal gland.

The ductless glands differ from all other secreting organs in this respect, that the products of their activities are not poured out through distinct anatomical channels, as is the pancreatic juice, or the bile, but reach the circulation in all probability through lymphatic absorption. Another distinguishing physiological feature of these organs is, that their function is chiefly controlled by the sympathetic nervous system, and only secondarily and in a minor degree by the cerebrospinal nervous system. The last mentioned fact has been proven experimentally by Knauer (34) and by Goltz (30). The former has transplanted the ovaries under the skin, without causing atrophy or involution of the uterus for a considerable length of time. The latter has transected the spinal cord of animals, who conceived and carried young thereafter normally.

The biochemical products elaborated by the ductless glands, may be divided according to Biedl(7) into two main groups: (a) Products which are necessary for the function of other organs, like glycogen; (b) Secretions, which Starling(71) calls "*hormones*" or activators; *i.e.*, substances which are capable of influencing through the medium of the blood, the functions of remotely lying organs.

Regarding the nature of these hormones a good deal is still unknown. With the exceptions of "adrenaline," which was first isolated by Takamine(77) in 1901, and of "spermine" produced by A. Poehl, of Petrograd, we still use products of the entire gland, as did Brown-Sequard(8) in 1899, when he injected himself with testicular extract.

These biochemical limitations are undoubtedly at the bottom of the many contradictions and uncertainties that still overshadow the field of organotherapy. With the rapid advances made in biochemistry, these difficulties are being gradually surmounted, and we are obtaining from time to time, not only purer, but also more numerous products, thus constantly widening the field of our activities.

Besides the biochemical imperfections in the organic products at our disposal, there is another factor which militates against uniform results in their clinical application, namely our inability to properly

determine in many cases, the exact "*interglandular reciprocity*" or "*chemical correlation*" that exists. Pineless(62) was the first one to call attention to the mutual relation that exists between the glands of internal secretion. Falta(22), Rudinger(67), and Eppinger(19) have corroborated this fact experimentally. They have shown that disturbed function in one of the ductless glands, is capable of upsetting the physiological equilibrium of other glands in the endocrine system.

The nature of these disturbances expresses itself in various forms. The partial or complete loss of function of one gland causes another gland to hyperfunctionate and increase in size, if that one has exerted upon it an inhibitory influence; or the latter will hypofunctionate and atrophy, if the former has influenced it in an acceleratory manner. This increased or diminished activity on the part of any one of the ductless glands, whether the result of either experimental or clinical removal of another gland, or due to pathological processes within the same or other glands, can be regulated by the administration of extract or hormones of the same or other glands, provided we know the exact reciprocal relation that is existing between the glands in question.

Based upon these observations, Okintschitz(60) has classified the glands of internal secretion into two main groups: (1) *Synergists* or glands whose hyperfunction and hypertrophy follows the removal of another gland, or hypofunction and atrophy of the same gland after the administration of extracts of the other. (2) *Antagonists* or glands in which hypofunction and atrophy ensues after the removal of another gland, or hyperfunction and hypertrophy of the same gland when extracts of the other are administered.

Having oriented ourselves in the fundamental principles underlying the theories of internal secretion, we shall now proceed to a consideration of the normal and abnormal workings of the endocrine glands individually.

III. *The Physiology and Physiological Pathology of the Gonads and of Those Glands of Internal Secretion with Which They are in Close Functional and Biochemical Correlation.*—The working hypotheses upon which this fascinating study is based are in the main two, clinical and experimental. Clinically we note the following points: (a) The morbid phenomena pursuant to disease of one or more of the ductless glands. (b) The therapeutic value of the extracts of these glands. (c) The symptoms that follow the removal of part or the whole of one or more glands during operation. Experimentally, the following observations are recorded: (a) What effect the removal

of part or the whole of any one gland will have upon the organism as a whole, or upon the structural and functional properties of the other glands. (b) The results of the administration of extracts of a gland, with or without its previous removal, or the removal of another gland or glands. (c) The effects of homotransplantation. (d) The effects of heterotransplantation.

THE OVARY.

The normal function of the ovary depends upon a perfect physiological balance among its three structural components, the follicular apparatus, the corpus luteum, and the interstitial gland. It is necessary to consider these morphological units separately, in order to be able to trace the various ovarian disturbances to their proper sources.

I. *The follicle apparatus* is genetically the earliest ovarian structure, it makes its appearance during intrauterine life. Functionally the primordial ova reach the height of their activity at puberty, when they mature, burst, and give rise to the formation of the corpus luteum. This process is termed ovulation. It denotes that the procreative abilities of the female are fully established, evidenced by a complete development of the sex organs, the sex instinct, and by an involution of the thymus and the pineal glands. In the vast majority of cases, ovulation is accompanied by a periodic discharge of blood from the uterus, known as *menstruation*. For a time the question as to which of the two phenomena just described is the cause, and which the effect, has caused a good deal of controversy. Physiological research and abundant clinical data have finally established the fact that ovulation may take place without menstruation, but the latter never without the former.

The generative faculties thus kindled at puberty, burn brightly up to middle age, then they flicker dimly to the end of this period, when they are finally extinguished at the menopause. At this time also menstruation which has heralded the blossoming of sexual life, now announces its withering and decay, it ceases.

As soon as impregnation has occurred, follicular function becomes temporarily suspended. The Graafian follicles, as was shown by Seitz(72), may continue to grow during pregnancy, but they do not ripen. Ovulation and menstruation are inhibited. Normally this momentary loss of follicular function calls for no therapy. If, however, this transient inhibition is continued beyond the physiological time limits, then clinical manifestations, such as hyperinvolu-

tion, protracted amenorrhea, lactation atrophy, and relative sterility appear.

Castration in the young results in an arrested development of the genitalia, in an ablation of sex characteristics, producing the eunuchoid type. After puberty, the removal of the ovaries, either experimentally in animals, or clinically in the human, on account of pathological complications, causes an atrophy of the genitalia, amenorrhea, permanent sterility, and a train of nervous phenomena, known as the *molimina* of menopause.

The disturbances arising from natural or acquired ovarian hypofunction may be entirely relieved, or ameliorated by the administration of ovarian extract, or through ovarian transplantation. Aschner(1) has produced an arbitrary menstrual flow in animals and man with follicular extract and by means of ovarian transplantation. Morris(48) has succeeded in curing a case of sterility by transplantation. Martin(42) is somewhat less sanguine about the results of ovarian grafting. He nevertheless entertains bright hopes for the future, when the technic of this procedure will become more refined, and points out the lesson, that the results of autotransplantation are far more encouraging than are those of homotransplantation. Okintschitz(60) has succeeded in delaying uterine atrophy in castrated rabbits by injecting them from time to time with biovar (follicular extract), but has failed to obtain similar results with luteovar (corpus luteum extract). The same observer has proven clinically, that ovarian hypofunction is most favorably influenced by follicular extract, and hyperfunction by corpus luteum extract. His experimental results are so striking that I have tabulated them for ready perusal:

SERIES NO. 1.—NONPUBESCENT RABBITS.

No. of rabbits	Castrated or not	Extract injected	No. of injections	Time of killing	Measurements at operation	Measurements at autopsy
3	Yes	None	None	2 months	7.0 × 0.3 cm.	4.0 × 0.13 cm.
2	Yes	Biovar	54	2 months	7.0 × 0.35 cm.	6.0 × 0.25 cm.
2	Yes	Proprovar	52	2 months	7.3 × 0.3 cm.	5.3 × 0.2 cm.
1	Yes	Proprovar	53	2 weeks	7.3 × 0.3 cm.	5.3 × 0.2 cm.
1	Yes	Luteovar	53	2 months	7.0 × 3.5 cm.	3.5 × 0.25 cm.
3	No	None	0	2 months		7.4 × 0.33 cm.

SERIES NO. 2.—PUBESCENT PAROUS RABBITS.

1	Yes	None	None	2 months	8.0×0.4 cm.	6.5×0.3 cm.
1	Yes	Proprovar	17	3 weeks	7.5×3.5 cm.	7.0×3.5 cm.
4	Yes	Proprovar	24	1 month	7.5×3.5 cm.	7.0×3.5 cm.
1	Yes	Oroprovar	63	$2\frac{1}{2}$ months	7.5×3.5 cm.	7.0×3.5 cm.
4	Yes	Luteovar	24	1 month	7.6×0.35 cm.	6.5×0.15 cm.
1	Yes	Luteovar	63	$2\frac{1}{2}$ months	7.6×0.35 cm.	6.5×0.15 cm.
1	No	None	0	2 months		7.8×0.4 cm.

The lessons learned from these experiments are: (a) The uterus will undergo atrophy after castration, and this atrophy is more marked in nonpubescent than in the pubescent parous rabbits. (b) Subcutaneous injections of biovar or proprovar will to a great extent prevent this atrophy, especially in the younger animals. (c) Luteovar is not possessed of these properties.

Notwithstanding these and many more clinical and experimental facts, all of which tend to show that the follicular element is the factor in the ovary, which governs, influences, and maintains sexual development, with its sequellæ, ovulation, menstruation, and fecundation; other investigators have tried to ascribe some of these properties to the corpus luteum. Fraenkel(24) claims that he has caused cyclical hyperemia and menstrual changes in the endometrium by the administration of corpus luteum extract. Meyer(45), Ruge(68) and Schroeder(74) came to the support of this view, and have attempted to show that there exists a parallelism between the morphological phases in the corpus luteum and the varying structural changes in the endometrium during a menstrual cycle.

The prevailing clinical, experimental, and genetic evidences do not coincide with the views just quoted. For if sexual development and activity depend upon the corpus luteum, then this structure should have been present in the ovary at the earliest period of its formation. The uterus reaches the full degree of its development before puberty. Graafian follicles grow even during intra-uterine life. Runge(69) avers that he has found this to be the case in 30 per cent. of cases; but they do not mature, hence no possibility for corpora lutea to form, and functionate. The report of Prochownik(63) that he has found a corpus luteum in a child three years old is simply a medical curiosity.

Additional light has been shed upon this question by Biedl(7) and Tandler(78), who have demonstrated the fact, that continued amenorrhea in cows was due to the persistent corpus luteum, which inhibited follicular function; for as soon as the corpus luteum was

destroyed, menstruation and fecundation have immediately returned.

Without culling many more examples from the vast literature, we may conclude by saying, that the power which promotes the development of the sexual organs in early life, and helps to maintain their activity later on, is inherent in the follicular apparatus.

II. *The Corpus Luteum*.—This structure appears in the ovary after the ripening of the Graafian follicles has commenced. It is formed by the cells of the membrana granulosa and during its evolutionary and involutionary periods, presents definite structural characteristics. These have been most thoroughly studied and described by Meyer(45), Ruge(68), Miller(46) and Frank(25). A detailed consideration of these morphological phases would carry us beyond the scope of this paper. For our present purpose a mere enumeration of them would suffice. They are in brief: (a) the proliferative period, (b) the period of vascularization, (c) the period of ripeness, and (d) the period of regression.

The cyclical changes in the endometrium, which have been studied, first by Kundrat and Engelmann(35), and later on most painstakingly described by Hitchmann and Adler(31), have been subdivided into four states, the premenstrual, the menstrual, the postmenstrual, and the interval. According to some observers, a functional relationship exists between the cyclical changes in the corpus luteum, and those of the endometrium. The true physiological significance of these morphologic synchronisms is still unestablished, owing perhaps to the clinical difficulties that such a study offers, in being unable to observe simultaneously, the structural changes in the endometrium and in the corpus luteum. We shall therefore leave this mooted problem, and proceed to a consideration of better known facts.

Ovulation as is well known may terminate either menstruation or pregnancy. Two types of corpora lutea would thus be formed: (a) corpus luteum spurium, in the former instance, (b) corpus luteum verum, in the latter case. The histological differentiation between the two types has of late been the subject of close investigation, and since it is of practical importance it deserves our attention. Aschoff(2) states that the corpus luteum of early pregnancy contains no free blood, or only minute traces thereof, while the corpus luteum of menstruation shows distinct hemorrhages during the period of vascularization. Miller(46) lays stress upon the presence of colloid material in the corpus luteum during the early months of pregnancy, which may also be found in the granulosa

during the puerperium. Calcium deposits also occur quite frequently up to the fifth month of pregnancy. Marcoty(47) adds another differential point; he states that the corpus luteum of pregnancy contains no fat, or only a small amount of it, while the corpus luteum of menstruation shows distinct fat infiltration. Besides the academic value of these differential points, they are also of importance in forensic medicine, as they assist in diagnosing the existence and the period of gestation.

The corpus luteum begins to functionate as soon as it becomes a structural entity. As early as 1874 Gustav Born, quoted by Vincent(80), surmised that the corpus luteum might be an organ of internal secretion. From hazy notions we have gradually arrived at certainties, and to-day the functions of the corpus luteum are almost axiomatic. Its chief properties are:

1. To sensitize the uterine mucosa, producing the cyclical changes of menstruation.
2. To prepare a favorable soil for the nidation of the impregnated ovum, by inhibiting temporarily, further follicular ripening, and thus the occurrence of the estrus (Loeb, 39).
3. To foster the implanted ovum during the early weeks of pregnancy and to exert this influence upon it throughout the entire period of gestation. Loeb(39) and Fraenkel(24) have shown experimentally that operative removal of the corpus luteum during the first six weeks of pregnancy will cause abortion or an absorption of the ovum. The writer has had several cases that have proven this truism. It is therefore advisable not to operate on ovarian tumors complicating pregnancy, before the third month of gestation, unless urgent reasons dictate otherwise.
4. To counteract to a great extent the noxious effects of pregnancy. Some clinicians are now availing themselves of this fact, and are employing corpus luteum extract in the treatment of toxemia of pregnancy.

III. *The Interstitial Gland.*—In 1863, Pflüger(65) described the presence of epitheloid-like cells containing fat in the stroma of mammalian ovaries. He considered these cells to be either storehouses of fat for the follicles, or as fatty degenerations of ovarian elements. Pflüger's report it seems has aroused but little interest, for we find that it was not until 1902, when Limon(40) and Bouin(9) for the first time described a similar structure in human ovary, that the attention of physiologists has been attracted to its importance.

Morphologically these cells are arranged according to Limon(40), in an orderly fashion, in the form of strands, along the course of

blood-vessels, and bear a close resemblance to the adrenal, and to the corpus luteum cells. This grouping suggests glandular formation, hence their function is most probably secretory. The term "interstitial" has been assigned to these masses of cells, on account of their peculiar situation, being found most frequently in the connective-tissue interstices. In the cortex of the ovary, the interstitial cells are scattered, due to the presence of the follicles and the corpora lutea, while in the medullary portion they are more compact, richly vascularized, so that each cell is surrounded by capillaries, almost on all sides.

Many other investigators have followed up the researches of Limon and Bouin and have arrived at various conclusions. Fraenkel(24) after examining the ovaries of forty-five different species offered the following conclusions: (a) The interstitial gland is inconstant in its occurrence, especially in the higher types of mammals, in monkeys and in man. (b) It varies in its distribution from time to time, being well organized and occupying the whole ovarian structure at one time, and consisting of but a few scattered cells at another time. (c) Owing to the fact that it is genetically a derivative of the end products of follicular degeneration, its physiological significance is doubtful.

Wallart(81), R. Meyer(45), and Keller(36) state that during pregnancy there is an increase of the interstitial elements in the human ovary. Seitz(74) on the other hand considers the appearance of these cells as due to the hyperemia of gestation, and not to an hyperplasia of interstitial elements.

Other factors which prevent and inhibit the development of the interstitial gland are inanition, poisoning, and hypofunction of correlated glands of the endocrine system. Experiments on dogs have shown that animals who under normal conditions present this structure before puberty most regularly, fail to do so when subjected to hunger, wasting diseases, or when deprived of other glands of internal secretion, which have influenced it antagonistically.

Aschner(1) in his recent exhaustive studies takes exception to Fraenkel's views. He claims that the interstitial gland of the ovary is ontogenically as well as phylogenetically a distinct morphological entity, and that it has a reciprocal relation to the corpus luteum. The time when it is most predominant is during the first year of life, it then begins to regress step by step, up to time of puberty, when with the formation of the first corpus luteum it disappears altogether. Aschner also suggests that the term "pubertatsdruse" is more

descriptive of this structure than the term "interstitial," which has been used hitherto.

In cases of hydatidiform mole, and chorioepithelioma, Stoeckel(76) and Boshagen(10) claim to have found the interstitial gland, while in other pathological conditions, such as inflammatory disease of the adnexa, myoma, chlorosis, etc., did not lead to its formation.

The interstitial gland of the ovary is therefore a structure of early life, puberty marks the end of its existence, and its occurrence in the ovaries of the adult constitutes one of the rarest histological findings. About the rôle it plays in the realm of internal secretion we have as yet no positive knowledge. Based upon morphologic premises, we may say that its physiological properties, if any, are in the main concerned with the formative period of life, and its influence upon vital processes after puberty is hardly conceivable.

Epitome of Ovarian Functions.—Experimental investigations, morphologic studies, and clinical observations thus far obtained, warrant these deductions:

(a) The female sexual gland is a compound organ, containing three structural elements, two of which, the follicle apparatus and the corpus luteum, are permanent in their existence, while the third, the interstitial gland, if at all present, may be found only in the ovaries of the very young.

(b) The ovary contains two distinct active principles, the Graafian follicle extract and the corpus luteum extract.

(c) The intraglandular relations of the ovary are synergistic, the interglandular relations vary, depending upon which of the two structural elements we are considering, for they bear different reciprocities to the rest of the ductless glands.

(d) Sexual development and maturation is to a great extent dependent upon the follicular apparatus.

(e) The corpus luteum becomes physiologically important after impregnation has occurred; it continues to exert this influence during pregnancy, and in a lesser degree throughout the period of lactation.

THE PLACENTA.

In addition to being the essential nutritive and respiratory organ of the fetus, the placenta also exerts an acceleratory influence upon the uterine hypertrophy and hyperplasia during pregnancy. This function it performs by virtue of its active principle or hormone, "chorin." Okintschitz(60) experimented with placental extract upon castrated rabbits, and has been convinced that uterine atrophy

could be prevented with far greater success by the subcutaneous injections of chorin, than with biovar or proprovar (follicular extract). Halban⁽³²⁾ has shown that morphologically, the chorionic cells and those of the cumulus oöphorus resemble each other very closely.

The structural similarities between the chorionic cells and parts of the ovary make their functional correlation more intimate. Hence the reason why the placenta is capable of supplementing the follicular function with greater efficiency, when the latter's activities are temporarily suspended. The interglandular correlation between the placenta and the follicular apparatus, as far as their influence upon the uterus is concerned is synergistic, and antagonistic to the corpus luteum.

Since chorin is a more powerful agent in producing uterine hypertrophy than the extracts obtained from the Graafian follicles, would it not be advisable to employ it, instead of the latter, when we desire to produce an enlargement of that organ, as in cases of underdeveloped uteri, infantile type. In cases of functional amenorrhea, it is also likely to produce beneficial results, for we have recently learned that the uterine mucosa as such also plays an important rôle in the phenomenon of menstruation, by reacting upon the ovaries.

THE MAMMARY GLAND.

The mammary glands like the uterus owe their development and growth to the follicular portion of the ovary. During gestation they undergo hypertrophy preparatory to their hyperfunction at the time of lactation. By what power or influence is this increase in size and function brought about? It is probable that during gestation their progressive growth may in part be influenced by the placenta. During lactation, however, the placenta has ceased to exist, the follicular function is also in abeyance, and the only gonad that is persisting is the corpus luteum. To this gland then must the acceleratory or antagonistic properties relative to the mammary glands be ascribed.

Clinically we note that the onset of menstruation in a lactating woman diminishes or totally stops the flow of milk. Conversely, prolonged lactation has a tendency to defer the return of the menstrual periods. How is this alteration of function accomplished?

The intraglandular relation between the corpus luteum and the Graafian follicles is synergistic, *i.e.*, inhibitory. Therefore, during lactation, when the corpus luteum is in ascendancy, the follicular

function is inhibited and no menstruation occurs. On the other hand, as soon as the follicular function is rehabilitated, the power of the corpus luteum wanes, it is no longer able to exert its antagonistic or acceleratory influences upon the mammary glands, and milk secretion stops.

These physiological facts lead us to the conclusion that the interglandular relation between the mammary glands and the ovary is "antagonistic" to the follicular apparatus up to puberty, and to corpus luteum during gestation and especially so during lactation.

In relation to the uterus, the mammary glands bear distinct "synergistic" properties. During lactation uterine contractions are most common, and if nursing is persisted in for too long a period, hyperinvolution, with the subsequent lactation atrophy occurs. Okintschitz(60) has injected castrated rabbits with "mammin" (mammary gland extract) and has noted that it hastens uterine atrophy. Mammin is therefore a potent adjuvant to the corpus luteum in causing a diminution in the size of the uterus, and forms a physiological antithesis to "chorin" (placental extract) which supplements the follicular function in enhancing and maintaining uterine hypertrophy.

Since mammin and luteovar exert the same influence upon the uterus, functional menorrhagia or metrorrhagia will be greatly benefited by corpus luteum therapy; by inhibiting follicular function, mammin will also yield gratifying results by causing uterine contractions and atrophy. It also seems plausible to employ in cases of mammary hypofunction, besides the extracts of the same gland, also the extracts of its antagonist, the corpus luteum, which will accelerate its function.

THE THYROID GLAND.

Castration causes an enlargement of the thyroid gland. If castration is followed by the administration of follicular extract, the thyroid will retain its physiological proportions. The therapeutic employment of corpus luteum extract does not prevent the thyroid hypertrophy subsequent to castration. Pregnancy also causes an increase in the size of the thyroid.

From our knowledge of glandular reciprocity, the above quoted experimental and clinical facts place the ovary and the thyroid in the category of synergists; in reality, however, they are antagonists. Let us unravel this paradox.

In Basedow's disease, the hyperfunction of the thyroid may or may not be accompanied by hypertrophy of the gland. Chrus-

talew(12) has shown that sections taken from thyroids in cases of Grave's disease contained but little colloid, which was in a state of liquefaction, it stained poorly, and in some places it was wanting altogether. The follicular epithelium on the other hand showed a marked proliferation, which indicated hyperfunction. Kraus(37) explains the paucity of colloid in the thyroid in cases of Grave's as due to a rapid discharge of the thyroid products into the blood and the lymph channels.

The enlargement of the thyroid observed after castration, or during pregnancy, must be viewed in the light of retention hypertrophy and not of hyperfunction. For these thyroids do not present an hyperplasia of the epithelial lining of their acini. The manner in which this enlargement is brought about is as follows:

Since "antagonists" influence each other in an acceleratory manner, castration removes the stimulating influence upon the thyroid, this gland ceases to be as active as before, or the organism as a whole, does not require as much of its secretions as it did hitherto, hence a temporary passive and relative hyperproduction of colloid ensues, with the resulting increase in the size of the thyroid. Pregnancy causes the same changes in the thyroid gland, due to a temporary suspension of ovarian function.

That the theory of retention hypertrophy is correct, is evidenced by the clinical facts that thyroid hypertrophy accompanying pregnancy, or the one following castration, does not present symptoms of hyperthyroidism. The simple enlarged thyroids of multiparæ is another well-known observation.

The interglandular relation existing between the thyroid and the mammary gland is also antagonistic. This is borne out experimentally, for injections of mammin help in maintaining the colloid accumulations in the thyroid in its highest degree of relative hypersecretion.

To sum up then we may state that the interglandular relation between the thyroid on the one hand and the ovary and the mammary gland on the other is "antagonistic," although positive histological and clinical data are still wanting. Based upon this partial truth, we may assume that cases of hypoovarism could be benefited by thyroid therapy, as well as cases of hypothyroidism should receive in addition to thyroid extract also follicular extract.

THE PITUITARY BODY.

Directly behind the chiasm, suspended by a thin, soft stem, known as the infundibulum, is an irregularly round gray mass, the hypophy-

sis. It lies in the hypophyseal fossa of the sella turcica, and is composed of two lobes, an anterior and a posterior.

Embryologically, the anterior lobe is developed from the epiblast of the buccal cavity, the posterior lobe from the embryonic brain.

Histologically, the anterior lobe is composed of three types of cells, eosinophiles, basophiles, and basal cells. These cells bear a quantitative relation to one another, in the order just enumerated. The posterior lobe consists of nerve tissue.

Highly differentiated structurally, the pituitary body possesses a still more complex physiology. Before puberty, the function of the hypophysis is to assist in part the as yet incompletely developed ovary, in promoting sexual maturation, it also maintains growth equilibrium. Cushing(15), Ascoli and Lagnoni(4) have shown that hypophysectomy performed before puberty, will inhibit the development of the genitalia, it will retard body growth, causing dwarfism, and produce a clinical entity known as Fröhlich's syndrome(26) or dystrophia adiposita genitalis.

After puberty, the removal of the hypophysis will cause adiposity, sluggishness, atrophy of the genitalia, loss of hair, and finally glycosuria, coma and death.

Hypophyseal hypofunction, resulting from functional or organic disturbances produces symptoms analogous in character to those following the experimental removal of this gland, only of a more insidious type.

Pituitary hyperfunction will cause an enlargement of the skeleton, resulting in the well-known disease acromegaly in adults, or gigantism with precocious sexual maturity in the young.

Since over- or underactivity of the hypophysis is capable of influencing the growth and the development of the sexual organs in a definite and direct measure, physiological disturbances in sexual glands ought to reflect upon the pituitary with equal certainty and constancy.

Castration causes an enlargement of the pituitary body (anterior lobe) with a consequent hyperfunction, expressing itself in an increase in the size of the body. Fichera (27), Tandler (79), and Meyer(52) have found that this hypertrophy is due to an hyperplasia of the eosinophiles. Okintschitz (60), on the other hand, reports that castration is followed by an increase in the size and number of the basal cells.

Pregnancy also produces an enlargement of the hypophysis (anterior lobe). Comte(14) was the first one to note this phenomenon. Erdheim and Stumme(20) have described the histological changes

that take place in the pituitary during gestation as follows: there is an increase in the size and number of the basal cells, their limiting membranes become more distinct, granules appear within the protoplasm which stain with various dye stuffs. So constant are these structural changes that the term "Schwangerschaftszellen" has been given to these cells. The hypertrophy in the pituitary is at times so marked, that by its pressure on the chiasm it may cause hemianopsia. This has occurred twice in the writer's experience. The hyperfunction of the pituitary during pregnancy, manifests itself by the general enlargement of the body, especially of the extremities and the face, thus resembling a mild form of acromegaly.

Another clinical fact worthy of note is, that while the enlargement of the thyroid during pregnancy does not mean hyperthyroidism, and the hypertrophy of the hypophysis at this period does not indicate acromegaly, yet it seems that the mild irritations set up in these glands after repeated hypertrophies will, in some cases, lead at last also to an hyperfunction. Hyperthyroidism and acromegaly are therefore more frequently seen in multiparæ than in nulliparæ, and with greater preponderance in those multiparæ who have borne their young at short intervals.

Castration followed by injections of chorin (placental extract), which simulates follicular extract in some of its physiological properties, causes an increase in the eosinophiles of the anterior lobe of the pituitary. Injections of luteovar fail to influence the histological changes in the pituitary, and the gland presents the same appearance as does the one of the castrated, but not injected animals. Okintschitz(60) agrees with other observers on the question of hypertrophy and hyperplasia of the pituitary that follows castration, but differs from some on the point as to which of the three types of cells in the anterior lobe undergo structural changes under various physiological and pathological states.

This divergence of opinion is not only limited to the histological phase of the problem, but the views on the relations of the ovary and the pituitary to metabolism are also at variance. Thus Alder (5), Christofoleti (16), and Munzer(53) consider the interglandular relations between the ovary and the hypophysis to be antagonistic, on account of the contrasting influences they exert upon bony growth and adrenal glycosuria. From the morphologic studies, however, we know that the hypertrophy and hyperplasia that takes place in the hypophysis after castration, or when the follicular function is temporarily suspended, places these two glands rather in the class of "synergists."

Another potent reason why our knowledge concerning the interglandular reciprocity between the pituitary and the ovary is still shrouded with many uncertainties, is the totally different anatomy and physiology of its two lobes. So far we have established the fact, based upon structural and functional data, that the ovary and the hypophysis are synergists, but we know practically nothing of the biochemistry of the anterior lobe that makes these results possible. On the other hand, we know that the posterior lobe possesses a definite hormone "pituitrin," which is able on raising, the blood pressure, to contract involuntary muscles, to strengthen the heart, to promote diuresis, and to cause uterine contractions in a most pronounced form. Pharmacodynamically then, we are well posted about the properties of the posterior lobe, but we are still in the dark about its interglandular correlation. Experimental physiology has thus far added nothing definite on this point. Removal of the posterior lobe seems to cause no detrimental results, although Cushing(15) claims that it is essential to life.

THE PINEAL BODY OR EPIPHYSIS CEREBRI.

This is a flattened, pear-shaped body which lies below the splenium of the corpus callosum in the transverse cerebral fissure. Its base is in front and is connected with the diencephalon through the habenula; the apex lies posteriorly and hangs freely down over the corpora quadrigemina of the mesencephalon enclosed by pia mater and united to the tela choroidea of the third ventricle.

Embryologically considered, the epiphysis is a vestigial remnant of a primitive dorsal eye. It is doubtful whether at any time in the process of evolution of the vertebrates, the pineal eye has ever functionated. Biedl(7) states that the pineal body undergoes involution at about the seventh year of life, when it is replaced by connective tissue hyperplasia and a deposit of lime known as "acervulus" or brain sand.

The anatomical inaccessibility and the doubt of its being possessed of internal secretory properties, on account of its embryologic derivation, have for a long time served as deterring factors in the experimental study of the physiology of the pineal gland. Within the past decade many of these difficulties have been surmounted, and the experimental physiologists have been able to contribute a good deal of interesting, though as yet, not conclusive information, about the normal and abnormal functions of the epiphysis.

The morphological tissue changes to which this gland is heir, run

the gamut of morbid anatomy. In the researches of Neuman (58), Weigert (83), and Falta(23) we find recorded that almost every form of tumor formation has affected this gland, the teratoma, however, being predominant. This disease has a predilection for the male sex, and occurs chiefly during the first seven years of life.

The symptoms caused by tumors of the epiphysis are (a) local and (b) trophic. The study of the former group belongs to the domain of neurology, so we will consider the latter. The nutritional disorders that manifest themselves as a result of pineal tumors are: a rapid increase in the length of the body, a gain in adiposity, and sexual and mental precocity.

Extirpation of the pineal gland have given varied results in the hands of different investigators. Biedl(7) and Dandy(18) have noted no physiological disturbances in the pinealectomized animals, who have survived the operations from three to eight weeks. They are of the opinion that the epiphysis is not essential to life, and that it possesses no endocrine properties. Foa(29) reports a retardation of growth and mental development after epiphysectomy for the first three months following the operation, but that there was a hyperdevelopment of the generative organs and the secondary sex characteristics. In about eight to twelve months later these animals appeared to be as normal as the controls. Exner and Boese(21) reported that in the six animals, out of the ninety-five experimented upon, who have lived up to puberty, no somatic or sexual defects were discernible.

The feeding experiments of Dana and Berkley(17), McCord(55), and Sarteschi(75), of pineal substance to animals and human beings, have resulted in an increase of weight, in an improved mental state, and in sexual precocity.

Injections of pineal extracts intravenously by Ott and Scott(61), have given results, as far as the circulatory apparatus was concerned, similar to those obtained from corpus luteum extract. After an initial depression there follows a prolonged rise of blood pressure, without any alteration in the pulse rate. It also causes a vasodilatation of the kidneys, thus increasing diuresis. The pregnant uterus shows marked contractions, but it has no effect upon the virgin uterus. The functions of the mammary gland are most favorably influenced by intravenous injections of one-third of a grain of pineal substance, which has produced a marked increase of milk secretion.

Castration causes an atrophy of the pineal gland, although Sarteschi(75) could not verify this fact with his experiments. Weigh-

ing carefully the clinical and the experimental data at our command, regarding the physiology of the pineal body, we find ourselves between two extremes, the nihilism of Dandy(18) who denies any physiological importance to this gland, and the more conservative views of Marburg(56), who has attempted to formulate a distinct pineal clinical entity. He classified all epiphyseal disorders under three headings: (a) hypopinealism, characterized by an hypertrophy of the genitals, (b) hyperpinealism, typified by adiposity, and (c) apinealism, manifested by cachexia.

* The later view is the one accepted by most authorities, and from the structural changes that take place in the genitalia after pinealectomy, or after the natural involution of this structure, and *vice versa*, the changes that are seen in pineal gland after oophorectomy, lead us to conclude that their interglandular correlation is "synergistic," for it is apparent that the pineal gland during its existence has exercised an inhibitory influence upon the sex organs.

THE THYMUS.

It is only within recent years that the thymus has been considered as part of the endocrine system, endowed with functions of internal secretion.

Its main function seems to be the production of lymphocytes, especially during early life. Bang(11) has found from five to six times as many nuclear elements in the thymus than is contained in other lymphatic structures. After birth the thymus begins to enlarge, it grows slowly up to the second year, when it begins to atrophy and is replaced by fatty degeneration.

Experimental thymectomy has been performed by Klose and Vogt(38), Matti(54), and others, with the following results: After a lapse of two to four weeks there ensued a diminution in the size of the extremities, the bones became softer, ossification and dentition was delayed, adiposity has increased, finally cachexia, somnolence, loss of coördination, coma and death.

Castration has caused delay in the involution of the thymus, and Tandler and Gross(78) have described an hyperplasia of the thymus in eunuchs.

The clinical syndrome, status lymphaticus, has always been ascribed to an hyperfunction of the thymus. Since Kopp's description of this affection in 1855, nothing new has been added by succeeding investigators to the knowledge of this disease. Falta(23) states that there are cases of enlarged thymus without an accompanying status lymphaticus, or a status thymicus.

The destruction of this organ by new growths or inflammatory processes fail to show functional disturbances in the organism. The only grave clinical condition that is caused by the hyperplasia of the thymus are mechanical in nature, causing pressure symptoms upon the trachea. This being the only condition when thymectomy as a therapeutic measure is indicated. Under no other circumstances is such a procedure justifiable, for the terminal sequences of thymectomy are most serious.

About the hormone of the thymus we know nothing. Feeding experiments and hypodermic injections of thymus substance, in cases of thymectomy have aggravated the symptoms, so the physiological status of this gland could not be learned from this study. Clinical attempts to cause hyperthymism have also failed.

For the present we must be contented by concluding that the thymus is in all probability a lymphopoietic organ, exerting also an inhibitory influence upon sexual maturation, as evidenced by its atrophy with the onset of puberty. Its interglandular relation to the ovary is therefore "synergistic."

THE ADRENALS.

The first definite account of the adrenals with illustrations of them was given by Eustachius in 1563. Addison in 1849 described a disease known by his name to this day, which is due to a tubercular affection of the adrenals. Brown-Sequard in 1856 performed the earliest extirpation of the adrenals, all the animals died shortly thereafter. He concluded that death in these animals was not due to adventitious lesions connected with the operation, but to a deprivation of adrenal secretions. The adrenals are therefore essential to life. Vincent(80) among other investigators coincides with this view.

Histologically the adrenals consist according to the description of Mitsukuri(51) of two parts, a cortical portion derived from the mesoblast, and a medullary portion formed from the peripheral part of the sympathetic system.

The physiology of these anatomical units has as yet not been fully established. The only positive knowledge we possess is about the pharmacodynamic properties of its active principle "adrenaline," which is contained in the central nervous structure of the gland.

The only sources upon which we can draw, at the present time, for information in order to establish the interglandular relation between the adrenals and the gonads are the pharmacodynamic properties of

these glands. Adrenaline raises the blood pressure, and promotes proteid and fat metabolism. The follicular portion of the ovary manifests the same properties. The adrenals undergo hypertrophy and hyperplasia during pregnancy, and although Okintschitz(60) could not verify this in his experiments, the prevailing opinion is in favor of the above mentioned view. Since the adrenals increase in size and hyperfunctionate when ovarian function is inhibited, as it occurs during gestation, the interglandular relation between the adrenals and the ovary ought to be "synergistic." Aschner(1) fully agrees to this supposition, and explains it on the inhibitory power exerted by the sexual gland upon the chromafin system, which in turn affects the nervous system.

In what way can this knowledge about the adrenals be applied clinically? It is an axiom, that in eclampsia the blood pressure rises, and the greater the toxicity of the poisons circulating in the maternal blood, the higher does the arterial tension mount, finally twitchings and convulsions may develop. Are not the clinical manifestations in eclampsia an expression of a conversion of potential into kinetic energy by the organism, in its attempts to defend itself against the invasion of the noxes of abnormal gestation? Is not the "kinetic drive" of Crile(13) but a response by the economy to mechanical, chemical, bacterial or psychic traumata? Are not the lesions found in the liver, in the kidney and in the brain identical in both conditions, shock and eclampsia? In which of the glands of internal secretion is this motive power, which can inhibit or augment these outbursts of oxidation, stored away? Crile claims that it is in the adrenals, and in his treatment of shock advocates morphine as a remedy *par excellence*, both as a prophylactic and as a remedial agent. Morphine accomplishes this, not only by diminishing the apperceptive and perceptive properties of the central nervous system, but also by inhibiting the adrenal output. Stroganoff in Russia and Stillwagen in this country, have obtained gratifying results in the treatment of eclampsia with morphine; in all probability, by keeping the adrenals under control.

If eclampsia and shock produce the same pathological changes in the kidneys, liver, and brain; if they manifest closely allied clinical phenomena; and if they yield to the same therapeutic agents; then both of them must either cause, or be caused by, adrenal hyperfunction. To inhibit the excessive output of adrenaline still further, it seems but rational to add to our morphine therapy an organic product of synergistic properties. In this case ovarian extract would suit best. My reasons for suggesting the extract of the entire ovar-

ian gland are twofold. First, to obtain the synergism of the follicular apparatus, second, to replenish the corpus luteum deficiency, which is perhaps responsible for some of the toxemias of pregnancy. We have as yet no data from which to draw conclusions as to its efficacy; on theoretical grounds it appears to be plausible.

IV. *Ovarian Extracts and the Functional Diseases in Which They may be used with Satisfactory Results.*—In order not to overstep the gynecological boundaries, I have limited myself to a consideration of the ovarian extracts only, and shall present this phase of the problem in a very brief and succinct manner, so that you may readily refer to it and make use of the information it bears with ease.

A. *Diseases to be Treated with Follicular Extract.*—Cases of hypovarism: (a) Amenorrhea, (b) Sterility, (c) Infantilism, (d) Dysmenorrhea, (e) Metabolic disturbances, especially the tendency toward adiposity, (f) Chlorosis, (g) The molimina of natural and artificial menopause, (h) Hyperthyroidism, (i) Dystrophia adiposogenitalis, and (j) Status thymicolymphaticus.

B. *Diseases to be Treated with Corpus Luteum Extract.*—1. Cases of hyperovarium: (a) Functional menorrhagia or metrorrhagia, (b) Increased sexual appetite, (c) Osteomalacia.

2. Cases of hypoluteism: (a) Emesis gravidarum, and other forms of toxemia of pregnancy, such as eclampsia, etc.

V. CONCLUSIONS.

1. Functional gynecological diseases should be studied objectively and not subjectively only; applying the same methods of investigation as are employed in the detection of organic disorders.

2. The pathology of functional diseases is outside the realm of cellular morphology. It invades the fields of physiology and biochemistry. Many of these disturbances are so subtle in nature, that they escape detection by the present means at our disposal, and some will probably never be solved.

3. To define a disease as functional we must be assured that all organic factors have been eliminated. For just as much harm may be done by submitting organic cases to functional therapy as by applying surgical treatment to some functional diseases.

4. It is not sufficient to merely ascertain which gland of the endocrine series is responsible for certain functional disturbances, but it is also essential to be informed about the interglandular relation that this gland bears to the other ductless glands under normal and abnormal states.

5. Owing to the intra- and interglandular reciprocity that exists between the ductless glands, a functional disease is in its final analysis never a uniglandular, but a polyglandular malady. It is true that the predominant symptoms are characteristic of the disturbances of the gland that is mainly affected, but the concomitant disturbances are just as important, and are due to the involvement of other ductless glands, which have been acted upon by this particular gland, and which in turn react upon it.

6. The ideal in organotherapy will be reached when, (a) Functional diseases will be properly diagnosed, (b) When the organic products offered for sale will be standardized and possess a stable physiological potency, (c) When the active principle not only of each gland, but of the different parts of the compound glands, such as the ovary, the hypophysis and adrenals, will be isolated.

7. If in my humble attempt to present before you the lights that illumine the field of functional gynecological disorders, and also the shadows that still obscure many of its important phases; if in this attempt, I have succeeded to arouse in you sufficient enthusiasm to give this subject closer observation than you have been accustomed to do in the past, my efforts have been well spent. Because from your failures and successes in the treatment of these disorders, the laboratory worker draws his inspiration and guide, how to improve upon his successes, and how to correct his errors. Be persistent and optimistic in your efforts; in spite of some failures, it will surely lead somewhere, indifference and pessimism will positively lead nowhere.

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THE RESULTS OF A ROUTINE STUDY OF THE PLACENTA.*

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WHILE I was a member of the staff of The University of California Hospital it occurred to me that, if the pediatrician might begin the instruction of his classes in the nursery of the Woman's Clinic, several useful purposes would be served. At first practical difficulties were encountered but Dr. William P. Lucas, Professor of Pediatrics, and myself were convinced that the principle which gave the pediatrician the opportunity to direct the care of newly born infants was sound; and we agreed to try the experiment. Our original plans required modification, especially because the care of the lying-in woman and her infant are not independent problems. But, precisely for this reason the obstetrician finds the counsel of his colleague valuable and, conversely, the pediatrician profits by information in the obstetrical history. Wishing to secure the fullest benefits from coöperation we decided to make joint-rounds twice a week and discuss questions relating to the common welfare of the mother and her infant. This arrangement guaranteed the success of our venture.

More fully than I had realized, these consultations taught me that the course of pregnancy influences postnatal development. The conscientious obstetrician should exhaust every source of information regarding fetal development and should place the facts at the disposal of the physician who will supervise the care of the infant during the early years of its life. If this principle is accepted—and I do not see how it can be questioned—the obstetrician will consider it his duty to examine the placenta in more detail than is customary.

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Intimately associated with fetal growth, the placenta may present phenomena which will influence the treatment the infant should receive. While such instances are exceptional and the placenta is normal, generally, certain knowledge of the latter fact provides one assurance that extrauterine existence was not begun with a handicap. On the other hand, if infant development does not progress as it should the placental examination has unusual value. In the case of prematurely born and stillborn infants as well as when the infant dies within the early weeks of life careful study of the placenta is indispensable to accurate diagnosis.

To-day, even in well-organized clinics the placenta is given slight attention. At the bedside a cursory examination is made to determine whether a portion has been retained; and, perhaps, the organ is weighed but further observations are not made. Sometimes no attention is paid to it. Upon a recent visit to a clinic used for the instruction of students in a medical school of the first rank, I found the only piece of scientific apparatus owned by the department of obstetrics and gynecology was an incinerator placed conveniently to the delivery room so that the placenta might be got rid of as quickly as possible. You will agree, I am sure, that this attitude is not extraordinary.

Obviously, in the hospital laboratory the examination of the placenta will be most thorough, but we have arrived at a period when the practitioner who owns a microscope may make useful observations. And, probably fuller knowledge of the structure and function of this organ will add to its importance in the interpretation of clinical manifestations. Antenatal pathology, as yet poorly endowed with facts, depends for its development in great part upon the solution of placental problems. Even where structural phenomena as infarcts have been satisfactorily explained, their underlying cause, their physiological significance, and their relation to fetal complications have hardly been guessed at. Other rudimentary facts remain obscure, and upon demonstration may radically change our conception of the manner in which the placenta performs its work.

My remarks based upon 600 placentæ collected from consecutive deliveries in the University of California Hospital relate to the pathology of the organ. No doubt a greater frequency of unusual cases is encountered in hospital than in private practice. On that score, objection may be raised to my conclusion that the placenta always deserves careful study. Yet routine is necessary that no abnormality may be overlooked. In my own case when attending

patients delivered at their homes, if the placenta had been routinely subjected to careful study, I should not have been without the explanation for a number of fetal deaths.

GROSS ANOMALIES.

Multiple pregnancy (twins).....	3	Extensive infarction	4
Abnormal shape of placenta	3	Placental cysts	1
Two vessels in cord.....	2	Succinturiate placenta	10
Velamentous insertion of cord.....	1	Partial retention membranes.....	17

In forty-one instances naked-eye examination of the placenta revealed abnormalities. Some of them could not have been overlooked, but in a hurried examination others would have escaped attention. Thus, in two cases the presence of a single artery in the umbilical cord was not detected until the specimens reached the laboratory. Clinically, one of the infants presented a number of deformities, and at autopsy only one hypogastric artery was found. Also, in the other case there was a perforated interventricular septum, though the infant lived and gained normally in weight.

In the case of velamentous insertion of the cord a living child was born. A fatal issue, as you know, is not expected from this anomaly unless the fetal vessels pass near the internal os, *vasa previa*, which, though not in this series, I have twice observed. In one case on account of rupture of an umbilical vessel antepartum hemorrhage occurred. Examination of the placenta demonstrated that the hemorrhage was fetal. In the other case as the head entered the pelvis the placental circulation was blocked; this infant also was stillborn.

Succinturiate lobes were encountered in ten instances; they may be expected in between 1 and 2 per cent. of all cases. As they are a well-known cause of bleeding and frequently become infected, the usefulness of determining whether or not the placental tissue has been completely expelled from the uterus, requires no emphasis. Nevertheless, it is pertinent to remark that in thoroughness the examination at the bedside is not likely to approach that made in the laboratory. And, bedside observations are less apt to be recorded; frequently, therefore, a poor memory is depended upon when definite records are needed for the interpretation of puerperal complications.

Portions of the membranes were missing in seventeen instances; six occurred in the first fifty cases. Later the complication was much less common. Usually, too hurried or vigorous conduct

of the third stage of labor accounts for this complication. My clinical assistants soon learning that the laboratory checked their work were encouraged to acquire a more perfect technic. To learn how cases are conducted when they cannot be personally supervised, I can recommend as one important means, complete placental records.

Another useful observation pertains to the stained microscopic sections. The blood-vessels in the chorionic villi often furnish a clue to the time when the cord was tied. If the ligature is not placed until pulsations cease the blood-vessels in the villi are relatively empty; on the contrary, if they are congested we may usually assume that the cord was tied earlier than it should have been. Occasionally, I have seen an interne surprised when upon the evidence afforded by the microscope he was fairly accused of being in a great hurry to bring his case to a conclusion. Also, in the instruction of students the comparison of placental sections where the cord was tied early with others where it was tied after pulsations ceased provides convincing evidence that the infant benefits when the latter procedure is adopted.

MATERNAL COMPLICATIONS.

Premature separation.....	5	Manual removal of placenta.....	3
Placenta previa.....	1	Abdominal pregnancy (term).....	1

The interpretation of a number of maternal complications depends upon the placenta, and we have encountered ten such cases.

In the event of premature separation our interest is to learn how much of the placenta is thrown out of function, what relation the location and the size of the separated area bears to the severity of the hemorrhage, and what region, if any, is most prone to become separated prematurely? This complication does not always have the same effect upon the fetus, though frequently it is fatal. Among the cases reported here only one terminated with the birth of a living child. In a great measure the result for the fetus is determined by the degree of separation; but may not other factors be involved? It is my impression that the complication is less serious for the fetus when the separation is confined to the circumference than when it penetrates the center of the placenta, even though no greater area is involved. However, with so few observations a dogmatic statement is undesirable.

Not only a better understanding of defective but also of normal placentation proceeds from the study of abnormal cases. Accordingly, intimate investigation of placenta previa is well repaid and likewise the investigation of a placenta which separates too early,

or one which is retained. In the event of a subsequent pregnancy such information may serve as a guide for the proper treatment, and indeed did aid us in one instance. A multiparous woman with a history of puerperal infection, when first my patient, suffered from a serious hemorrhage during the third stage of labor. The placenta was removed manually. The firm attachment was explained by fibrous adhesions between the uterus and a portion of the placenta. When eighteen months later, anticipating the same complication, the patient entered the hospital for the birth of her fifth child, Cesarean section with supravaginal hysterectomy was performed. The pathological condition which existed in the previous pregnancy was again found and justified the operative treatment.

Very frequently an intimate study of the placenta contributes to a clearer understanding of the physical condition of the fetus. For example, when delivery occurs prematurely the placental findings are significant, for in that case the question of syphilis may always be fairly raised. Such a possibility we considered from various angles in seventeen premature deliveries where the fetus was between 30 and 40 cm. long and weighed between 1000 and 2000 grams. In six instances the diagnosis of syphilis was established; in the others it was excluded. All the syphilitic infants died; the mortality among an equal number of premature infants born of mothers suffering from eclampsia or allied intoxication was 50 per cent.

PREMATURE INFANTS.

(Weight 1000 to 2000 grams; length 30 to 40 cm.).

Cause	Living	Died
6 Syphilis.....		6
6 Maternal toxemia.....	3	3
1 Pyelitis.....		1
1 Extensive infarction.....		1
3 Undetermined.....	1	2

Unless glaring symptoms of some other disease are present there is a tendency to regard as syphilitic every premature infant. Obviously, this is incorrect; in our small series syphilis was present in roundly a third of the cases. The diagnosis was established upon the evidence afforded by both the placenta and the Wassermann reaction. The results of these tests, as I have found in a series of consecutive deliveries, closely agree, but before discussing this point let us review the evidence upon which the diagnosis of placental syphilis rests.

Contrary to the teaching of the past generation which lacked accurate means of investigation, it is unsafe upon the gross appearance of the placenta alone to base a diagnosis of syphilis. When the fetus has died some time before its birth, no matter what the cause, the placenta may be very firm, may have a gray, anemic color and the maternal surface may have a greasy appearance. Nor do large placenta always denote syphilis. Labourdette(1) has also demonstrated that, as a sign of syphilis, less importance than we had supposed attaches to the relationship between the weight of the placenta and the weight of the fetus. In cases where this disease could be excluded through the history and a negative Wassermann reaction he found the ratio not infrequently 1 : 5, 1 : 4, and occasionally 1 : 3. The relationship appears somewhat more reliable when applied to premature infants, but in these circumstances it is important to remember that prior to term the placenta normally weighs more than a sixth of the weight of the fetus.

More trustworthy evidence of syphilis is found in the chorionic villi. When freshly teased in normal salt solution or water and examined microscopically, if syphilis is present, the villi are enlarged, opaque, and irregular in shape with swollen ends. Characteristically, also, the blood-vessels are not apparent in many of the villi. While such findings are suspicious they should be verified by the examination of properly fixed, hardened, and stained sections before the diagnosis of syphilis is positively made.

Stained sections mainly show huge, dense villi, but they provide a more satisfactory opportunity than the fresh villi for observing the blood-vessels. There the pathological process seems to begin; the wall of the vessel is the seat of an endarteritis which frequently obliterates its lumen. The enlargement of the villi is due to proliferation of the stroma. So rarely may spirochetæ be demonstrated that clinically the procedure has not proven useful.

With these histological changes as a criterion for syphilis we have examined 600 placentæ: the findings warranted a positive diagnosis in fourteen cases. At first we did not request a Wassermann test routinely but later through the kindness of Dr. L. S. Schmitt who carried out the serological tests, a Wassermann reaction was made upon every woman who was a patient in the obstetrical ward of the hospital. Therefore, I am able to report the results in 260 cases where the placental findings were controlled by the Wassermann upon the mother. These cases fall naturally into four classes.

COMPARISON OF THE WASSERMANN REACTION AND THE
PLACENTAL FINDINGS

Group	Wassermann	Placenta	Number Cases
I	Negative	Negative	242
II	Positive	Positive	7
III	Negative	Positive	1
IV	Positive	Negative	10

In Groups I and II which include 249 cases (95 per cent.) there was absolute agreement between the Wassermann reaction and the placental histology.

The single case in Group III in spite of the negative Wassermann test must be regarded as syphilitic. This woman, twenty-seven years of age, had four consecutive miscarriages. The pregnancy we observed ended spontaneously at the eighth lunar month. The fetus, 40 cm. long, weighed 1960 grams; the placenta weighed 480 grams and the chorionic villi were definitely syphilitic. At autopsy upon the fetus organic lesions characteristic of congenital syphilis were found. Therefore, excepting the result of the Wassermann, all the evidence pointed to the presence of syphilis. The conclusion, then, must be that occasionally the placenta enables such a diagnosis to be made when the Wassermann reaction is negative.

However, this case does not constitute a new criticism of the Wassermann reaction. Serologists agree that syphilitic individuals, even when suffering from secondary manifestations may not show a positive reaction, and as time passes the likelihood of a negative test gradually increases.

Group IV comprising ten cases is not so discordant as would at first appear, for a strongly positive Wassermann reaction (+++) was obtained only in two instances. One of these patients was suffering from a streptococcus infection which probably was responsible for the reaction. At least the Wassermann test alone indicated that the case was syphilitic. No history of a specific infection could be obtained, and the chorionic villi were normal. On the other hand, the fetal surface of the placenta was the seat of an inflammatory infiltration; streptococci were found in the sub-amniotic connective tissue. This organism also was present in microscopic sections of the cord and on the third day of the puerperium was isolated from the uterine cavity. The infant died of hemophilia; at autopsy the lesions of congenital syphilis were not demonstrable. Therefore, the positive Wassermann in this case would not seem attributable to syphilis. Occasionally, in the course of scarlet fever analogous results have been obtained.

Almost certainly, the second case in which the Wassermann reaction was strongly positive but the placental findings negative, was syphilitic. On Sept. 5 and again at the time of delivery on Nov. 18, 1914 the serological test was positive. Furthermore, the mother gave a history of specific infection eight months previously and had not been treated. The maceration of the fetus made it impossible to identify the lesions of congenital syphilis; stains for spirochetæ were not made.

The teased, chorionic villi were suspicious of syphilis, though the stained sections were negative. It may be, however, that other areas of the placenta would have presented the characteristic evidence of syphilis, for it is a well-known fact that normal areas may occur in syphilitic placenta. Certainly, in this case the weight of evidence favors the diagnosis of syphilis and also favors the conclusion that occasionally the Wassermann reaction is more trustworthy than the placental histology.

In the eight remaining cases of Group IV, the Wassermann reactions were faintly positive. The serologist reported six results as a single +, and two as a double +. To my mind it is significant that every one of these patients was suffering from a toxemia of pregnancy with albuminuria. Yet, the severity of the intoxication did not determine the degree of fixation presented by the serological test. Thus, a double + was once reported when the albuminuria was of a mild grade, and, on the other hand, several times a single + occurred when the albuminuria was severe.

A second Wassermann test unfortunately was never made. That precaution must be taken before it is said certainly that a toxemia of pregnancy may explain a faintly positive Wassermann reaction. However, it seems likely that the result of the test may be so explained. Thus, in none of the eight cases could a history of syphilitic infection be obtained. The placenta were normal, and the infants were healthy. When discharged from the hospital they were in excellent condition. Four weeks later they were visited and none of them had developed stigmata of congenital syphilis. From the available information it seems that these infants were not syphilitic, though a longer period of observation would be required to establish the fact absolutely. Taking all the evidence together it is little short of certainty that the faintly positive Wassermann of these mothers was not due to the usual cause.

The frequency with which the Wassermann reaction is positive during toxemia of pregnancy, and the question of its association with a definite type of autointoxication are interesting problems.

The limited data at hand does not permit an uncompromising view, but it is pertinent that among the 260 cases upon whom serological observations were made there were twenty-two patients suffering from albuminuria and in fourteen the Wassermann reaction was negative. Approximately, then, in every third case a positive reaction obtained. Whether syphilis underlies these toxemias is a question which may be raised but it seems more likely that some substance in the blood, referable to the metabolic disturbance, causes slight fixation when an examination is made according to the Wassermann technic.

To summarize briefly the conclusions reached from the analysis of 260 cases, in the first place, it is clear that the chief source of confusion in the interpretation of the Wassermann test during pregnancy lies in the presence of an autointoxication attended by albuminuria. The suggestive reaction which frequently accompanies this toxemia must be attributed—as serologists generally attribute slight degrees of fixation—to some condition independent of syphilis. Classifying these cases of toxemia as negative for syphilis and also taking into account the cases in which Wassermann and placenta were both in agreement we have arrived by each method of investigation at the same result in 257 instances or nearly 99 per cent. of the cases.

Contradictory results were present in three cases. One of them yielding a positive Wassermann was suffering from a streptococcus puerperal infection and, it would seem, not from syphilis. This disease, however, was certainly present in the remaining two cases in one of which the Wassermann was negative while the placenta was positive; in the other the Wassermann was positive but the placenta negative. Accordingly both examinations were required to make sure the diagnosis.

The microscopic examination of the umbilical cord is without great practical value toward establishing the diagnosis of syphilis. Only in rare instances as Emmons(2) has shown may spirochetæ be demonstrated there. Moreover, exudative inflammation of the umbilical vessels which Bondi(3) regarded specific for syphilis may be quite independent of this disease. In an analysis of 400 obstetrical cases Simmonds(4) definitely established the presence of syphilis in forty instances and only half of these cases presented inflammatory changes in the umbilical cord. On the other hand, in thirty-two cases where syphilis could be excluded oomphalitis was present. The etiological factor was not determined by Simmonds but prob-

ably, as in similar cases we have studied,(5) bacteria have gained entrance to the cord through the placenta.

Generally, placental bacteremia occurs in cases in which the membranes have ruptured prematurely, either at the onset of labor or at least several hours before delivery. The frequency of this complication is notably increased in cases of abnormal presentation, of contracted pelvis, and of elderly primiparæ, and therefore, is more often seen in hospitals than in private practice. However, since my attention was directed to the complication and the placenta has been studied with reference to it, I have been surprised at its frequency.

The lesion consists of an acute exudative inflammation beginning upon the fetal surface of the placenta and since the fetal blood-vessels cross this region they are quickly involved. By appropriate staining methods bacteria may be demonstrated in the subamniotic connective tissue, at times also in the walls of the fetal blood-vessels. Perhaps, because the time interval is not sufficient, in most instances the infection does not spread to the decidua, and the villi are rarely involved. Evidently the bacteria enter the placenta from the amniotic cavity. Infection of the amniotic fluid occurs because the membranes have ruptured prematurely and vaginal examination leads to the contamination of the amniotic cavity.

The mechanism has become much clearer since we have learned that when the membranes rupture prematurely the amniotic epithelium loses its cuboidal form and becomes tall and narrow. The basal attachment of the cells is considerably restricted. The nuclei are dislocated upward and at times actually forced through the cell membrane. These alterations seem to be merely the expression of mechanical forces referable to the retraction of the uterus. From the histological picture it is evident that the function of these cells is greatly impaired, or absolutely terminated, and in the course of time they are desquamated for longer or shorter stretches leaving the amniotic connective tissue uncovered. Probably, through these portals the bacteria gain entrance to the placenta.

FETAL AND EARLY INFANT DEATHS.

(Weight over 2000 grams; length over 40 cm.).

Syphilis.....	7	Toxemia of pregnancy.....	2
Birth injury.....	6	Enlarged thymus.....	1
Premature separation placenta.....	4	Pneumonia.....	1
Placental bacteremia.....	4	Abdominal pregnancy.....	1
Congenital heart lesion.....	3	Undetermined.....	4

As the placental invasion is usually limited to the amniotic

surface of the placenta the complication is more likely to be serious for the infant than for the mother. Not infrequently infection of the fetus leads to its death either shortly before or within a few days after it is born. If my experience is not unusual, as a cause of fetal death placental bacteremia is outranked only by syphilis and birth injuries.

Since the lesions depend for recognition upon the study of histological section, routine study of the placenta for the purpose of demonstrating bacteria should be undertaken whenever intrapartum fever occurs or when labor is prolonged after the membranes rupture. By this means the presence of bacterial infection may be demonstrated in cases where otherwise the cause of fetal death would remain undetermined.

RECAPITULATION.

Gross anomalies.....	41 cases	Premature infants.....	17 cases
Maternal complications....	10 cases	Question of syphilis.....	18 cases
Death of infant.....	33 cases	Placental Bacteremia.....	4 cases

Recapitulating the results of the study of 600 placentaë, we have found that approximately one of five or six specimens presented some departure from the normal or required examination to elucidate clinical manifestations on the part of the mother or the infant. Moreover, when the placenta was normal the pediatrician was interested in the fact, for this information made it more certain that the infant began life with a clean bill of health.

In well-organized clinics the careful study of the placenta should be insisted upon not only at the bedside but also in the laboratory. Such rigid requirements cannot be exacted of the practitioner but if he wishes not to overlook important data he should supplement bedside observations with study of the placenta in his laboratory. It should be weighed and measured, gross abnormalities noted, fresh tissue teased, and the chorionic villi studied microscopically. These data should be recorded and thus become more reliable, if in the puerperium some complication develop which requires for its interpretation a knowledge of the placenta.

When the teased villi suggest the presence of syphilis the placenta should be sent to a pathological laboratory and stained sections prepared to establish the diagnosis. Simultaneously a Wassermann test upon the mother's blood should be made. Similar precaution is advisable if delivery occurs prematurely. At times a diagnosis of syphilis will be the result, but more frequently the investigation will remove all suspicion of that disease. Finally, if the infant is

stillborn or dies within the first few days of extrauterine life study of the placenta should be comparable in painstaking care to that given the organs at an autopsy.

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POSTPARTUM HEMORRHAGE.*

BY

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A STUDY of the cause, prevention and treatment of postpartum hemorrhage must be based on an understanding of the physiological processes involved. Were it not for the wonderful protection provided by nature, no child could be brought into the world without sacrificing the life of the mother.

From the fifth month of pregnancy certain changes are taking place in the mother's blood. At term we find a definite increase in the total quantity of blood in its cellular elements, especially leukocytes and in its coagulability. The need of these changes becomes apparent when we consider what takes place during the third stage of labor.

Throughout labor there is a gradual change in the structure and arrangement of the muscle bundles in the uterus caused by the uterine contractions. In the second stage there is a gradual adaptation of the body of the uterus to conform to the fetus in its descent. This is accomplished by a thickening of the uterine wall due to the overlapping and rearrangement of the muscle bundles, actual shortening of some of the fibers, and is called retraction.

The cavity of the uterus diminishes gradually as the fetus is expelled through the parturient canal. Following delivery of the

* Read before a meeting of the New York Obstetrical Society, April 11, 1916.

child, the uterus contracts until the cavity is practically obliterated. During this time, the placenta remains attached to the uterus and the placental site diminishes in area. The uterine wall at the placental site does not contract and retract equally with the rest of the uterus.

In the normal case, following the delivery of the child, there intervenes a variable period of from three to five minutes during which the uterus is passively contracted. With the reappearance of the active contractions, the placenta separates from the uterine wall at a central point, the separation beginning in the deep layer of the decidua. During relaxation hemorrhage occurs at this point from the torn sinuses. At the next contraction still further separation is brought about by the blood being forced laterally. Owing to the firm attachment of the placenta at its margins, the accumulating retroplacental blood forces the center of the placenta away from the uterine wall, causing inversion of the placenta. The placenta, on being expelled from the uterus, appears at the vulva with the fetal surface presenting and the blood lost during the separation enclosed within the membranes. This method of separation, although described first by Baudeloque, is known as Schultze's method.

In other cases there is a slight loss of blood during the time of separation. Here the placenta is usually separated first from the margins, and is expelled rolled on itself with the lower margin appearing first at the vulva.

The latter method, known as Duncan's method, is not as common and is more apt to be seen where there is a premature separation due to severe contraction during the second stage, where there is traction from a short cord or where too vigorous massage of the uterus has been employed immediately following delivery. After separation of the placenta, the contractions of the uterus continue until the placenta and its membranes, with the accompanying clots, have been expelled from the cavity.

During the separation of the placenta, the amount of blood lost from the open sinuses is kept at a minimum by certain changes that are taking place in the uterine wall at the placental site. Near the end of pregnancy a change in the structure of the terminal arteries supplying the sinuses has occurred. The external and middle coats have disappeared and the walls are composed now only of endothelium.

These vessels and sinuses are surrounded by muscle bundles extending both longitudinally and circularly. During the con-

tractions of the uterus, following the delivery of the child, these muscle bundles at the placental site undergo retraction. This shortening of the muscle fibers mechanically cuts off the lumen of the enclosed thin-walled sinuses and blood-vessels. At the same time, the contraction of the uterus compresses the arteries as they enter and pass through the wall to reach the placental site, and the blood current is almost completely cut off during uterine contraction. In performing a Cesarean section, anemia of the uterus is often observed following the action of pituitrin.

After the expulsion of the placenta, the uterus remains in tonic contraction. This firmly contracted uterus, together with the quickly formed clot at the placental site, normally prevents further loss of blood.

The term "postpartum hemorrhage" is applied to an excessive loss of blood during and shortly after the separation and expulsion of the placenta. It is rather difficult to estimate when the normal amount lost becomes abnormal. The amount flowing from the vagina during the separation and expulsion of the placenta in a normal case should be less than 1 pint. In operative cases there is no practical method of accurately measuring the amount lost. We can only estimate this by the rate of flow or the persistency of the oozing. By the use of a specially constructed bed, Ahlfeld collected blood during several thousand labors. He concluded that the average loss was about 400 c.c., but a much larger amount might be lost by healthy women without serious effects. He found that the normal amount varies directly with the size of the placenta, and that the size of the placenta varies directly with the size of the child.

Zangemeister reported observations on 2930 normal cases in 1910. He found that loss up to 1 pint had no serious effects on the patient. The average loss was 170 c.c. Ten per cent. were over 200 c.c. and 5.3 per cent. over 500 c.c.

It should be our aim in handling every case to limit the loss of blood to a minimum. At times even a moderate amount has serious effects, namely, inability to meet the demands of nursing, excessive nervousness, loss of sleep and appetite, with a resulting lessened resistance to any complications that might develop.

Cragin, in his text-book, reports 20,000 deliveries at the Sloane Maternity, with a frequency of one in ten, but he considers hemorrhage to have occurred when the amount lost has been estimated over 16 ounces.

At the Manhattan Maternity, postpartum hemorrhage occurred

in 222 cases during 13,000 deliveries, an incidence of one in 58 cases. Some of these were delivered on the outdoor service, where, as far as possible, the same technic was employed as in the hospital. Out of 222 cases there were four deaths.

Generally speaking, hemorrhage can be ascribed to one of three causes: first, lacerations, second, inefficient contraction and retraction, and third (fortunately rare, but when present serious), hemophilic diathesis.

Lacerations of the cervix which are not extensive enough to enter the broad ligament and cause rupture, are rarely, if ever, a cause of serious hemorrhage. Moderate hemorrhage occurred in eight cases not associated with placenta previa. Three of these necessitated suture. The others required only hot vaginal douches; the bleeding in the latter cases was controlled, no doubt, by firmer uterine contractions caused by action of the douche.

In two cases of ruptured uteri in which the lacerations extending into the broad ligament were carefully packed, the extent of the laceration was not diagnosed sufficiently early to render possible the employment of more effective means. Therefore, in all cases where hemorrhage is clearly due to laceration of the cervix, it is of greatest importance to explore quickly the extent of the injury before attempting to control the bleeding by packing. In many cases after firm uterine contraction is obtained, hemorrhage of the cervix can be checked by firm packing, but if the tear has invaded the broad ligament, the tampon alone will be ineffective and valuable time and a great amount of blood may be lost.

Perineal and vaginal lacerations do not often cause serious hemorrhage. One case of laceration of the perineum and one of laceration involving the veins of the vestibule caused profuse hemorrhage until controlled by suture.

Inefficient contraction and retraction usually means atony of the uterus. The cause of this atony, or inefficient contraction, may be general or local. Under the first division, there were forty-seven cases where the cause of hemorrhage was due to prolonged labor. In twenty of these cases the average length of time of labor in primipara cases was forty-seven hours and twenty-five minutes and twenty-three hours and nine minutes for multipara cases. Where delivery is operative, we must also consider the effect of shock and anesthesia in some of these cases. Chloroform over a long period seems to have an influence in causing atony following delivery. Fifty-nine per cent. of the cases were multipara. No conclusions

could be drawn regarding the age of the patients. The proportion at different periods seemed to be about the same as normal cases.

Under the local cause of atony, the most common was something within the uterus which interfered with normal contraction, such as retained placenta, membranes or clots. In seventy-six cases, hemorrhage was associated with retained placenta. The placenta was wholly or partially adherent, partially separated, or free but retained, as is seen in a condition known as "hour-glass contraction." Blood clots alone were a frequent cause of atony.

In seventeen cases the placenta was reported to be completely adherent. This seems too large a number as the condition is rare. It is usually due to a chronic endometritis. If the placenta is completely adherent no hemorrhage can occur, as no sinus is open. In these cases the hemorrhage occurs during the manual extraction which was necessary to separate the placenta from the uterine wall.

More commonly do we find the placenta partially adherent. With part of the placenta separated, the uterus cannot expel the adherent portion, nor contract to cut off the open sinuses. Profuse hemorrhage results. If only a small part of the placenta is adherent, this may be retained and the remainder expelled. The part retained, usually a cotyledon, may prevent persistent retraction with a resultant hemorrhage. The type of bleeding in these cases, as in the case of clots, is excessive and persistent oozing.

In three of our cases, the part of the placenta retained was the accessory part of the placenta succinturiata. If the uterus is not explored at the time and the part removed, late or secondary hemorrhage may result. In four cases hemorrhage occurred between the seventh and eleventh day. A small fragment of retained placenta was the cause in each case. In one of these, the hemorrhage was almost sufficient to cause a fatal result on the seventh day.

In twenty-five cases, retained membranes, in proportion to their bulk, prevented proper contraction and retraction. The chorion is more apt to give trouble than the amnion or decidua. The cause of retention is often too early expression of the placenta. When the placenta has had time to separate, the membranes are rarely retained.

In nine cases, hour-glass contraction developed. This is caused by undue relaxation of the uterus and a formation of a contraction ring in the lower uterine segment. Hemorrhage taking place, the upper segment becomes ballooned. In three of these cases, distention was sufficiently great to cause symptoms of shock. Anesthesia relaxes the contraction sufficiently to allow the hand gradually to enter

and deliver the placenta and clots, thus allowing the uterus to contract. All of these cases occurred on the outdoor service. With proper management of the third stage, the condition should not develop.

Twins and hydramnios are usually considered to be a cause of atony of the uterus by producing overdistention. In 175 cases of twins, there were only three cases where bleeding was reported, and in these cases labor was prolonged and difficult. Hemorrhage occurred in two cases complicated by hydramnios. Both of these conditions are more important as factors causing prolonged labor than as the direct cause of uterine atony.

Fibroids in two cases were a cause of atony by interfering with contraction.

Too rapid extraction is often a cause of hemorrhage when sufficient time is not given the muscle bundles in which to rearrange themselves.

The most severe type of hemorrhage occurred in placenta previa. Excessive bleeding following delivery was reported in fifty-seven out of seventy-five cases.

The sources of the hemorrhage were the placental site and lacerations of the cervix. The latter were frequent and often serious. The cervical tissues are rendered unusually vascular by the location of the placental site in the lower uterine segment and more friable by the infiltration of the villi.

The fibers in the lower uterine segment have not the retractive power of those above the retraction ring, so that immediately following the separation of the placenta the sinuses and terminal arteries remain open.

Hemorrhage is controlled by obtaining firm uterine contraction, because the blood supplying the sinuses enters the uterus above the retraction ring. But where there has been some laceration of the tissues, the firm contraction above is not sufficient, and firm packing must be used to control the bleeding from the torn sinuses.

In the management of placenta previa cases, we should bear in mind that the amount of blood lost previous to and during the first stage of labor must be kept at a minimum. When patients have lost a large quantity of blood before entering the third stage, we find the bleeding in some cases impossible to control. The blood seems to have little or no power to clot. There were two deaths in the fifty-seven cases of postpartum hemorrhage due to placenta previa.

CASE I.—Placenta previa, history No. 42. Patient was thirty-

nine years old; para-ii; when brought to hospital was bleeding profusely and in shock. Examination showed the cervix a little over two fingers dilated and the placenta centrally situated. Under anesthesia the cervix was dilated with a Pomeroy bag, and full dilatation was obtained at the end of one hour and fifteen minutes. A stillborn child was delivered by version and breech extraction.

On account of hemorrhage, the placenta was manually extracted. An intrauterine douche was given and the uterus firmly packed with gauze. An infusion of 1500 c.c. was given. Hemorrhage continued in spite of the firm packing. The patient died within an hour.

It was learned later that the patient had bled profusely for two hours before coming to the hospital.

CASE II.—Placenta previa, history No. 69. Patient was twenty-six years old; para-iii. Pregnant thirty-six weeks. Had slight and intermittent bleeding during the month previous to coming to the hospital. On the day previous to admission had a sudden, profuse hemorrhage which was controlled by vaginal packing. On the morning of the day she was admitted to the hospital, packing was removed and a few hours later a second profuse hemorrhage occurred. The vagina was packed and the patient taken at once to the hospital. A few hours later, in the hospital, the cervix was found to be three fingers dilated and soft. The patient was taken to the operating room and, under an anesthetic, podalic version was done and a leg pulled down into the cervix. During this maneuver the placenta was detached and removed. A slow breech extraction was now done and as the head approached the cervix, it was perforated and delivered. After a hot intrauterine douche the uterus was packed with gauze. In spite of ergot and pituitrin the uterus continued to relax; there was constant oozing through the packing. There seemed to be no attempt at clotting. In spite of stimulation the patient died at the end of two hours.

From the moment the diagnosis is made, placenta previa cases must be under constant observation. This can be done practically only in a hospital. Manual or instrumental dilatation, where the placenta is partial or complete, cannot be done without lacerations.

Early induction will limit the loss of blood previous to labor.

We must avoid operative delivery until the cervix has become fully dilated.

In marginal and lateral varieties, early rupture of the membranes was sufficient to control bleeding in many cases and allowed spontaneous delivery. This method failing, we pack or use Voorhees bags. The bags are to be preferred; they control bleeding, aid in dilatation and tend to keep up the contraction. The gauze packing, unless introduced under anesthesia, will not control hemorrhage in every case; repacking may be necessary, and there is greater danger of infection.

Of nine cases where antepartum packing was used, five had

temperature during puerperium. There was no temperature in any one of five cases where bags were used.

In complete or partial varieties we may control bleeding by tamponade, bags, or pulling down a foot.

Tamponade is more apt to fail in controlling bleeding than either of the other two methods. Failing by tamponade, we are more apt to attempt manual extraction and rapid delivery to prevent further loss of blood.

By the use of bags, or by pulling down a foot, we allow the cervix to dilate slowly with the possibility of spontaneous delivery.

In eighteen of the seventy-five cases of placenta previa, the delivery was spontaneous. There was hemorrhage in eleven of these cases, or 61 per cent. In fifty-six cases some operative method of delivery was used and hemorrhage followed delivery in forty-six, or 82 per cent.

In most cases proper management of the third stage of labor will prevent an excessive loss of blood.

Immediately following the birth of the child, in a normal case, the uterus needs little or no attention. When there is slight bleeding at this time, the uterus should be gently massaged until contraction takes place. This, in a majority of cases, is sufficient to control the hemorrhage. The tendency at this time is to do too much rather than too little.

Of 1006 cases, on the outdoor service, at the Manhattan Maternity, where birth of the child occurred before the arrival of the doctor or student, in only three cases hemorrhage was reported as being excessive.

There is a great tendency on the part of the students or the internes during their first month's service to pay too much attention to the uterus during the period immediately following delivery. They know they should keep their hand on the fundus during the third stage, but the mistake they make is this: instead of allowing the hand to rest lightly on the fundus, to make sure that it does not relax and become overdistended with blood, they immediately begin to knead the uterus, thus causing tonic contraction of the uterus. They forget the period of rest needed by the uterus before it begins to contract and separate the placenta.

Too early massage of the uterus causes partial separation of the placenta; bruises the wall of the uterus and sets up irregular contractions; breaks up the retroplacental hematoma, thus delaying and interfering with the normal physiological process; and causes retention of both placenta and membranes.

At the Manhattan, the routine management of the third stage is

so arranged that the attendant during this period is occupied with the care of the baby. In the hospital the nurse, and on the out-door service a student, is assigned to watch the fundus.

After the pulsation of the cord has ceased, the attendant is occupied with tying the cord, lubricating the baby thoroughly with sterile albolene, wiping off the baby with a sterile towel, applying a dressing to the cord, putting on the binder, and treating the eyes with a solution of argyrol.

If, during separation of the placenta, slight hemorrhage occurs, the nurse is instructed to make gentle massage of the uterus to promote firmer contraction. No attempt is made to expel the placenta until the expiration of at least twenty minutes.

Experience quickly teaches one to recognize by grasping the fundus whether the placenta has been expelled from the cavity of the uterus or not. This expulsion is shown by a smaller, firmer and more movable uterus, the ascent of the fundus and descent of the cord.

The ideal course would be to leave the expulsion of the placenta to the voluntary efforts of the mother, but it is impractical. As this often consumes several hours, some assistance is usually necessary to effect the complete expulsion.

Having satisfied ourselves that the placenta has been separated, we should instruct the patient to bear down during the time that the uterus is contracting. Voluntary efforts failing, the uterus should be massaged until firm contraction takes place. Then, by pushing downward in the direction of the canal, we force the placenta, lying in the lower dilated uterine segment and upper vagina, to descend. As the placenta reaches the lower part of the vagina, usually the patient completes its expulsion by bearing down.

The placenta, lest the membranes be torn, is supported by the hand as it leaves the vulva. The complete membranes and about 6 to 8 ounces of blood clots accompany the placenta.

If part of the membranes are caught in the contracted cervix, or are adherent to the decidua, gentle traction is made on the membranes without twisting. If, at the same time, the fundus is pushed back at intervals, it tends to lessen the kink in the cervix. If too vigorous traction has been made and the membranes have been torn, the remaining secundines may be completely removed by the use of an ordinary sponge-holder.

The placenta and membranes should be carefully examined at once, and if any part of the former is absent, the uterus should

be explored. It is not necessary to explore for retained membranes unless more than one-half have been retained.

No douche or medication is given unless indicated.

The nurse keeps the uterus firmly contracted for one hour. During this time she is instructed not to remove her hand from the fundus and to keep up firm contraction by gentle massage whenever the uterus relaxes. She reports at once any signs of excessive bleeding as shown by frequent observation of the vulva pads.

An abdominal binder is applied solely for the comfort of the patient. In our opinion it has no effect on the action of the uterus.

During the first twenty-four hours the pads are changed as often as necessary; in normal cases once in every four hours. Excessive oozing during the first twelve hours is almost always due to a clot in the uterine cavity. Vigorous massage and pressing downward of the uterus expels the clot and prevents further hemorrhage.

During the first six hours following delivery the patient is instructed to lie on her back with knees together. Careful watch of the bladder will prevent overdistention which displaces the uterus upward and to one side, causing relaxation and hemorrhage.

During the first three days of the puerperium the patient should be protected as much as possible from anything which might cause excitement.

The most important point in the treatment of hemorrhage postpartum is prompt recognition of the source of the bleeding. Hemorrhage from a tear in the cervix is always of bright color, follows immediately after the delivery of the child, and persists after firm contraction of the uterus.

Pituitrin gives prompt and satisfactory results in most cases, ergon and ergotol do not act as promptly, but the effect seems to last longer.

In cases where the placenta is partially separated, if the bleeding is not controlled by contraction of the uterus, the placenta must be expressed immediately. This failing, manual extraction is indicated. With proper precautions as to asepsis, this can be done without much danger. Of 13,000 cases it was necessary in 100 cases, and in only 3 was it followed by a temperature above 101, and no case above 102.

Where hemorrhage does occur, in the large majority of cases, it is controlled quickly by prompt and vigorous massage of the uterus followed by hot vaginal and intrauterine douching, and by pituitrin or some preparation of ergot which is given deep into a muscle.

If there is a tendency for the uterus to relax following this treat-

ment, we feel sure of maintaining contractions by introducing gauze packing into the uterus and vagina. Fifty of the 222 cases were packed with failure in only three. In some cases, especially placenta previa, packing was done immediately following delivery as a preventive measure.

We must bear in mind that the effect of the packing is due not to the action of the gauze, but to the contraction of the uterus obtained by the act of inserting the gauze into the uterine cavity. The firm pressure of the gauze in the uterus maintains the contraction. The very act of packing stimulates contraction and stops hemorrhage. If the gauze has been firmly packed into the uterine cavity, we may be sure that the contraction will be maintained. Besides the pressure of the gauze against the placental site, hemorrhage is controlled by its action as an aid in coagulation of the blood.

If the uterus is packed improperly we do not control bleeding, but the packing tends to increase the hemorrhage. Packing fails in those cases where the gauze is not carried to the upper part of the uterine cavity, and in such cases acts in the same manner as retained clots by preventing contraction and retraction. In three cases packing failed to control hemorrhage.

CASE III.—Vertex, L. O. A., No. 6458.

Patient was twenty-two years old; para-i. She had a long second stage, but delivered spontaneously. At the end of forty-five minutes there was evidence that the uterus had little or no contractile power and the placenta was delivered by Credé's method. Following this there was persistent oozing which continued for one hour, in spite of hot douches, ergot and pituitrin. At the end of this time the patient was beginning to show evidences of loss of blood, although the pulse rate was not over 100. The quality of the pulse was soft and small. It was decided to pack the uterus.

Before this could be done the patient suddenly became very restless and the pulse more rapid and weak. Owing to the serious condition of the patient the uterus was packed without an anesthetic. At the same time an infusion was given. By the time the packing was completed, and the infusion given, the pulse and general appearance had greatly improved. One-eighth grain of morphine was administered, the bed elevated, and heat applied. During the next hour, after the slight initial improvement, the pulse suddenly disappeared, and the patient died within a few minutes. Examination showed that the gauze had not been carried well up into the fundus and that it was saturated with blood. There was considerable amount of blood in the vagina which showed no evidence of clotting. There was no laceration of the uterus or cervix.

As the patient was exhausted from long labor, she should have been packed early, as soon as it was evident that there was a tend-

ency on the part of the uterus to relax. If the packing had been done earlier an anesthetic could have been given and the gauze carried well into the uterine cavity. As it was, the gauze was insufficient in amount to produce contraction, and as a result the loosely packed gauze increased the hemorrhage.

An infusion before we are sure that bleeding is under control does harm by increasing blood pressure and diminishing coagulability of the blood.

Where the patient is suffering from effects of severe hemorrhage, recovery is more rapid by allowing the patient absolute rest by a small dose of morphine, applying heat and by increasing the fluids by frequent small quantities of water by mouth.

It should be our aim in handling every case to limit the loss of blood to a minimum. At times even a moderate loss has serious effects, namely, inability to meet the demands of nursing, excessive nervousness, loss of sleep and appetite, with a resulting lessened resistance to any complications that may develop.

PSYCHIC VAGINISMUS, WITH A REPORT OF TWO CASES.*

BY

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THAT there exists a condition characterized by spasmodic contraction of the muscles situated about the vagina, reflex in character, which is termed vaginismus, may be taken for granted. Whether, as Dudley believes, it is a symptom only, due, as he says, "to appreciable or . . . unknown causes," or is an actual clinical entity, is a matter for debate, which I have no desire to enter into at the present time.

Vaginismus has been defined as a "reflex spasmodic contraction of the constrictor ani, the levator ani, and adjacent muscles;" but it may be added that the reflex spasm is out of all proportion to the exciting stimulus and generally spreads to other muscles, involving the adductors and extensors of the thigh and the muscles of the trunk, causing opisthotonos.

Now, in spite of the well-recognized characteristics of this condition, one is somewhat surprised on examining the literature and case reports on the subject, to find that the term vaginismus has been erroneously extended to cover a wide variety of conditions, varying all the way from the slight discomfort of the newly married to painful coitus due to tender masses in the culdesac of Douglas, and from kraurosis vulvæ and senile vaginitis to irritable

* Read before a meeting of the New York Obstetrical Society, April 11, 1910.

urethral caruncle. Now with any of these conditions vaginismus may be present as a symptom or may be superimposed as a resulting neurosis, continuing after the cause is removed, but loosely to class many cases of dyspareunia as vaginismus seems to me to be an abuse of terms.

In order to define our subject more accurately, let us first exclude from consideration all cases of dyspareunia *per se*, for it is self-evident that the term dyspareunia, meaning painful intercourse, must, in the very nature of the thing, presuppose the possibility of coitus—as well discuss dysentery accompanied by complete constipation, or dysmenorrhea with the absence of the menstrual phenomena—in vaginismus the act of coitus is impossible of performance.

Dyspareunia, we believe, should be classified according to its etiology and the situation of exciting cause, as: (1) Internal (or superior), where the cause is high up, as, for example, painful or tender masses in the culdesac, or inflamed tubes, or sensitive adhesions in retroversion, etc.; (2) External (or inferior), where the cause is below the internal genitalia, as, for example, tender conditions about the outlet, fissures, irritable caruncles, painful conditions about the hymen.

In all these cases of dyspareunia there is a more or less easily ascertainable cause, the removal of which should produce a cure; but in none is there that characteristic reflex contraction precluding coitus, which is characteristic of vaginismus.

Having defined vaginismus, let us attempt a classification according to its etiological factors.

Pozzi names three particular types, those showing:

1. Hyperesthesia with contraction;
2. Hyperesthesia without contraction;
3. Contraction without hyperesthesia.

His second type (hyperesthesia without contraction) appears to be a phase of dyspareunia, for the very definition of vaginismus as a muscular contraction excludes this type.

His third type (contraction without hyperesthesia) seems to be true or psychic vaginismus.

Pozzi proceeds to state that two conditions are necessary for the production of vaginismus: "first, great nervous excitability, and, second, some irritation of the external genitals which serves as a starting point for the exaggerated reflexes . . . thus producing hyperesthesia and contraction." Thus, after stating that the condition may exist without hyperesthesia or contraction, as the case may be, he makes the combination of hyperesthesia and contraction the chief characteristic of the disease—so it is seen how easily

the confusion of terms comes about and how soon loose terminology may result in loose diagnosis and ineffective treatment.

Audrey of Toulouse, in a really admirable article, "*Sur les dyspareunies vaginales*," puts into one class cases due to vaginitis or vulvitis (our external type of dyspareunia), and into a second class those cases showing what he terms the "essential syndrome of vaginitis." The latter he again subdivides into:

1. Cases of neuralgia of the vulva, and
2. Cases of true vaginismus (*vaginisme vraie*) or what we have called psychic vaginismus.

The cases of neuralgia of the vulva are distinguished from dyspareunia due to vulvitis by the absence of inflammation or "the extreme insignificance of the lesions of the mucosa;" and from true vaginismus by the "continuance of the painful phenomena, or, rather, by the fact that the painful phenomena exist in the absence of coitus or any attempt at coitus." He therefore insists that the attempt at coitus causing the spasm is the determining factor in the diagnosis of "true vaginismus," *i.e.*, the fear of coitus rather than the pain of contact must be the causative factor in true vaginismus.

Hirst, after defining vaginismus, states that "in the examination of some subjects, no evidence of spasm in the constrictor muscles of the vagina appears. It is only the nervous excitation of the attempted intercourse that excites the spasm." Here he recognizes the possible absence of tenderness as a causative factor, and the predominance of the neurotic or psychical element in certain cases.

Personally, I should prefer to divide the cases of vaginismus into:

1. Organic, *i.e.*, those which depend upon some ascertainable cause, such as a tender myrtiform caruncle, irritable hymen, ulcer or fissure about the vulva or lower vagina, etc., and
2. Those cases where there is no ascertainable pathological lesion about the external genitalia, not failing to remember that from repeated efforts at intercourse a condition of extreme irritability about the introitus may be set up in the second class, or that an actual neurosis may result from a very small lesion in the mucosa in the organic type in a highly neurotic individual.

The two cases which seem to illustrate this second or psychic type of vaginismus occurred in my private practice and are especially interesting because the causative psychic factors were easily ascertained in each case, and, the fear being removed, a permanent cure resulted in each case, without recourse to operation. I shall omit all the unimportant details.

CASE I.—Mrs. M.; aet. twenty-four; applied first April, 1911, when convalescing from the influenza; very indefinite as to her chief

complaints. I found a tubercular lesion in her left apex and sent her back to her family doctor, who sent her to the Adirondacks. She returned, cured of her pulmonary trouble, in September, 1912.

After three calls, at none of which could I discover why she came, she confessed that although married since April 1910 (nearly two years and a half), she had never been able to endure coitus.

Previous History.—Negative, except above. She admitted that she had always been a supersensitive, impressionable girl, subject to "blues."

Menstrual History.—Normal; twenty-eight day type; four days unwell, with slight pain of a crampy character the first day.

Present Illness.—Married, April, 1910, to a chauffeur employed in the same family with her; for several weeks before her marriage, another member of the same household, who was a widow, had tried to frighten her with tales of the pains and discomforts of married life, until at one time she had decided to break her engagement because of the fear created by these stories, but was dissuaded by the other servants. After marriage, all attempts at intercourse were futile. At the approach, there was a contraction of the parts, approximation of the thighs, straightening of the legs, and arching of the back; if the attempt were persisted in several times there had been a general convulsion followed by unconsciousness, so alarming that a physician had been hurriedly called.

Operations.—April, 1910: Examined by Dr. McC. under general anesthesia, who "broke her hymen." May 10, 1910: Same physician, under general anesthesia, "cut a band," whatever that may mean. May, 1910, one month after marriage, examined under general anesthesia, by Dr. B., and declared normal. September, 1910, Dr. F. operated under general anesthesia and cut away the remains of the hymen, and dilated with packing and a glass plug. There was a long after-treatment, about which she is very hazy, having had convulsive attacks whenever the doctor tried to examine her. September, 1912, two years later, she was unimproved, and still in her original condition.

First examination unsatisfactory; patient exhibited symptoms of vaginismus of extreme type first, before, and later, as soon as the examining finger touched the vulva.

Second examination (preceded by codeinæ sulph., gr. $\frac{1}{2}$, and sodium bromide, gr. xx); was able to introduce one finger up to the cervix.

Third examination (preceded by the same medication, with the addition of a solution of anesthesin in warmed albolene to the vulva and vagina) very satisfactory. Vulva, vagina, and cervix normal; uterus small, anteflexed, approaching the infantile type.

Diagnosis.—Vaginismus, without tenderness or organic lesions.

Treatment.—Advised to cease attempts at coitus for three months, and told that her trouble was entirely mental and that she must overcome it herself.

April, 1913, revisited my office. There was no improvement. She was sent to Dr. Habbermann at the Vanderbilt Clinic for hypnotic treatment. Dr. Habbermann hypnotized her eight differ-

ent times, each time suggesting to her that there was no real reason for her trouble.

June 15, 1913. The patient came to my office still unrelieved. I then spent some time explaining in detail about her case, and apparently convinced her that her trouble was past.

September 12, 1913. Patient returned from the country cured. She declares that hypnotism had nothing to do with her cure, but that I had convinced her at our last meeting.

March 20, 1916. Patient continues well, living a normal married life, in spite of a slight dyspareunia, due to a slightly tender prolapsed ovary.

CASE II.—Mrs. W.; aet. thirty-five; referred by Dr. Brainard Wheelock, July 14, 1914. Chief complaint: Had never been able to have coitus.

Family History.—Negative.

Menstrual History.—Formerly regular; twenty-eight day type; with no pain, and of four to five days' duration. At present, type every three weeks, with excessive pain and moderate menorrhagia.

Previous History.—As a girl, was hysterical and very sensitive to criticism; at times, self-accusatory. Very devout Catholic; easily impressed by others. Had worn a plaster cast for tuberculous disease of the spine for eighteen months, followed by a steel brace for two years. Married, November, 1911, while still wearing the brace. She had had a psoas abscess before marriage, which has now healed. Dr. Whitbeck had advised her against marrying, on account of the dangers of possible pregnancy, but in spite of this advice she married after making an agreement with her husband to forego all sexual intercourse. This strange agreement was lived up to, but with some difficulty, and with an immoderate expenditure of will power. Coitus was never attempted until she was declared entirely cured and child-bearing was considered safe.

Typical symptoms of vaginismus appeared at the first attempt, and have persisted to date.

Examination.—General physical examination, negative. Vaginal examination unsatisfactory at first, on account of mild reflex reaction.

July 21. Examination (preceded by bromide gr. xx, and codeine gr. $\frac{1}{2}$, taken half an hour before), very satisfactory; genitals normal; no tender spots; uterus normal. I spent about an hour trying to convince the patient that her trouble was entirely imaginary and caused by a fear which had now been removed.

March 6, 1915. Patient visited my office and was found to be five months pregnant.

July 4, 1915. Delivered normally of a female child by Dr. E. J. Davin.

Now the inferences which may be drawn from these two cases are:

1. That there are cases of true vaginismus whose causative factors are not local but mental. In Case I, the inhibiting impulse was conscious rather than subconscious at first, and had been imparted by suggestion from a second person. In Case II, the inhibiting

influence was caused by a long-continued suppression of a natural impulse by the exercise of will power, and after the cause for the voluntary conscious suppression was removed the performance of the act was inhibited subconsciously.

Both cases resembled hysteria and may be considered true phobias (as Audrey considers them); at any rate, their psychic origin cannot be doubted. The followers of the Freudian school would undoubtedly have traced the neurosis to some suppressed desire of a sexual character in early youth, but fortunately in these cases the causes were evident.

2. As to diagnosis: Many writers advise immediate examination under an anesthetic to ascertain, among other things, if there are any tender spots, etc., in the genital tract—but how one can elicit tenderness in a completely anesthetized patient passes my understanding. Examination should be tried gently without any anesthetic at first, and anesthesia should be resorted to only after patient efforts have failed. A point that I failed to mention is that if tenderness is present it may be elicited by the patient herself, for in this form, as a rule, there is no reaction when the patient uses a douche or other form of vaginal medication. I had patient No. I apply the anesthesin and albolene herself.

If tenderness or local lesion exists, then examination under ether, immediately followed by such operative procedures as are indicated, is advisable. The case would then fall under the class of organic vaginismus.

In all cases, the diagnosis should be made only after an exhaustive psychic examination, as the treatment depends upon the mental condition of the patient.

3. As to treatment: Case I had ample and varied surgical treatment. It would seem as if in many of these cases the suggestive effect of a surgical operation might itself work a cure, and I have no doubt that many cases of cure have been attributed to an operation when the psychic effect was the main factor. Case II had no surgical treatment. Case I was cured, I have no doubt, by hypnotic suggestion, in spite of her belief to the contrary. Case II was cured by the removal of her inhibition, by auto-suggestion if you please, but at any rate by suggestion of some kind. The cure was the more easily accomplished because the original condition was due to a logical self-inhibition.

Whether the cases are to be classed with the phobias as is done by Audry; with the hysterias, as Dercum of Philadelphia does; or as subconscious inhibitions, due to suppression of conscious desires and impulses, as taught by Freud, I leave to the psychiatrists to decide. At any rate, for our purposes, they can be considered neuroses; and I feel sure that, being psychic in origin with no organic basis, they should be considered neurological rather than surgical cases.

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 249 WEST SEVENTY-SECOND STREET.

A STUDY OF 117 CASES OF ECTOPIC GESTATION.*

(FROM THE SERVICE OF DR. HENRY C. COE, BELLEVUE HOSPITAL.)

BY

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THIS paper is a study of the cases of ectopic gestation in the service of Dr. Henry C. Coe, 3d Gynecological Division of Bellevue Hospital, and covers the period from July, 1897, to January 1, 1916, thus overlapping into the present service of Dr. W. E. Studdiford.

One hundred and seventeen patients have been operated on as follows:

Dr. Coe, 24; Dr. Austin Flint, Jr., 7; Dr. W. E. Studdiford, 53; Dr. Eben Foskett, 33.

The subject of ectopic gestation has been quite thoroughly studied and discussed, yet it holds its interest for the gynecologist. Many cases are easy of diagnosis. Other cases call for the most careful study and days of observation, and a few are found only at the time of operation.

In making a diagnosis in a suspected ectopic, too much value must not be placed on any one symptom. The case as a whole must be studied and the history, symptoms, blood count, and physical examination all receive due consideration, and then in case of doubt a vaginal section will definitely settle the question.

In this paper we have made a study of the various symptoms and facts to see if they coincide with the established views in cases of ectopic gestation, and our results follow:

Among these patients 104 were married, 8 were widows and 5 were single. Six were under 20 years of age, 39 were 20 to 25; 37 were 25 to 30; 23 were 30 to 35; 10 were 35 to 40; and 2 were over 40.

Previous Venereal History.—Seventeen of the 117 patients gave a distinct history of gonorrheal infection, 7 of them having it at the time of operation, the other 10 having had it some years before.

Four had syphilis and one of them had it in secondary stage at

* Read before the Society of the Alumni of Bellevue Hospital, December, 1915.

the time of operation, combined with gonorrhea. Only in sixteen cases did the patients complain of leucorrhea.

While this seems a small proportion of venereal cases we must bear in mind that many women have gonorrhea without being aware of the nature of their trouble, so it is probable that the above number is only a part of the specific cases.

Previous Pregnancies.—Of 117 patients, 90 had been pregnant before. Of the 90 patients, 52 had had children at term only, 34 had a history of abortions and children at term, and 4 had had abortions only.

Of the abortion cases, 5 admitted they were induced; and 1 patient had a history of 8 induced abortions; 5 were curetted following the abortion.

Of the deliveries at term, 3 were instrumental, and 1 a version; 2 were curetted after delivery, and 3 were septic after.

It is noted that about one third of the patients had previous abortions. To the writer it would appear that these abortions and their sequelæ would be a more common cause for the development of ectopic than venereal disease.

Date of Last Pregnancy.—Of the 90 pregnancies antedating the ectopic 5 were more than 10 years before; 26 were 5 to 10 years before; 24 were from 1 to 5 years before; 26 were 1 year or less. In 10 date not recorded. It is also noted that many women who had not been pregnant were married for many years at the time of ectopic.

Regular Menstrual Periods before Ectopic.—One hundred and five patients called their menses regular, 9 were irregular, some having 2, and some 6 and 8 weeks between their menstrual periods, 3 were not recorded, 21 only complained of pain during previous menstrual periods, 7 called the flow profuse and 3 scanty.

Missed Menstrual Period at Time of Ectopic.—Seventy-seven of the 117 had a definite history of missing one or more menstrual periods, 31 did not give history of missing a menstrual period, 1 had a continuous flow for $4\frac{1}{2}$ months, and in 8 the date of menses was not recorded. Five patients were nursing babies at time of onset and of these, 3 had had regular menses preceding ectopic, and 2 had not menstruated.

Attempted Abortion in Ectopic Patients.—Twelve of the patients thought themselves pregnant. Seven of these attempted to induce abortions, one by injecting glycerine into the uterus, 3 by medicines given by doctors, one went to a doctor who dilated the cervix, and 2 inserted foreign bodies into the uterus.

Symptoms.—The classical symptoms of ectopic gestation are pain, hemorrhage, faintness, vomiting and collapse.

In this group of cases, pain was present in all and usually was described as colicky or cramp-like in character. In most patients there were periods of freedom from pain in which some of them could go about their household duties.

In 18 patients the pain began during a regular menstrual period. In 7 pain began a few days after cessation of a regular menstrual period, and in 77 after missing a regular period.

Uterine bleeding was present in all of the cases and in many was intermittent in character. Four of the patients were curetted for this symptom before coming under our care, and 2 had had a second curettage before being sent to the hospital.

Vomiting and fainting were present in 62 patients. Collapse was noted in 40 patients. Eight of the patients fell in the street in collapse, and several were picked up by ambulances under such conditions and usually brought to Bellevue with some other diagnosis. One patient was in 2 hospitals before coming to Bellevue, and 1 was refused by 2 ambulance surgeons.

Chills were present in 12 patients. Sixteen complained of bladder symptoms and 14 of rectal symptoms due to pressure.

The Urine in Ectopic Cases.—One patient had sugar in urine and made a good recovery. One had 1 per cent. of albumen in the urine, and 23 had a trace of albumen.

Leukocytosis in Ruptured Tube Cases.—Ten showed over 20,000 leukocytes, the highest being 32,000, 6 showed 15 to 20,000 leukocytes, 11 showed 10 to 15,000 leukocytes, 10 showed under 10,000 leukocytes, in 12 count was not made, total 49 cases.

Leukocytosis in Tubal Abortion and Tubal Pregnancies.—Seven showed over 20,000 leukocytes, 4 showed 15 to 20,000 leukocytes, 20 showed 10 to 15,000 leukocytes, 28 showed under 10,000, in 9 count was not made, total 68 cases.

We have found the blood count to be of value. If we are making a differential diagnosis between a pelvic abscess, a pyosalpinx or acute appendicitis, a low leukocyte and polynuclear count points to an ectopic, rather than to an infection.

The leukocytosis is high in those cases having a severe hemorrhage into the peritoneal cavity.

In 17 cases with severe hemorrhage, including both tubal abortions and ruptured tubes, a leukocytosis above 20,000 was present. These patients were all operated on soon after admission or soon after the rupture when it occurred in the ward.

This leukocytosis comes on early and disappears in 24 to 48 hours. In this it differs from the secondary anemias where the leukocytosis comes on late and persists.

The polynuclear count in these patients ranged from 81 to 92 per cent. and averaged 86 per cent. This point is well illustrated in case No. 115, who had a rupture of the tube and hemorrhage into the peritoneal cavity while in the ward, and a hurried operation. She had a leukocyte count of 10,000 and a polynuclear count of 75 per cent. on admission. One hour after the onset of the rupture with hemorrhage the leukocyte count was 20,000 and the polynuclear count 86 per cent.

In looking up the literature on this point, we find that Dr. Carl Levinson in the *Journal American Medical Association* (April, 1915), called attention to this and he quotes Dr. Quevain, who reports one such case, and Dr. Hoesle who reports 3.

The hemoglobin is often from 35 to 40 per cent. in the hemorrhage cases, and in the case of an interstitial ectopic in our service, was but 10 per cent. the day after operation.

Number of Patients with Rupture of the Tube.—Forty-nine of the 117 patients had an actual rupture of the tube. Eight of these ruptured between the folds of the broad ligament; 2 of these had secondary rupture carrying the fetus and blood into the peritoneal cavity. Sixty-four of the 117 were tubal abortion cases, either blood or all the contents of the tube being expelled from the fimbriated end of tube. Four were unruptured tubal pregnancies with no bleeding from the tube.

Location of gestation sac in tube was interstitial in 1; isthmian in 64; ampullar in 52.

Tube Involved.—The gestation was in left tube in 74 of the patients. Right tube in 43.

Time in Hospital before Operation.—Of the 64 tubal abortions and 4 tubal pregnancies, 5 were operated on as soon as possible after admission to the hospital. Fifty-nine others were in an average of $5\frac{1}{2}$ days before operation. The average time in hospital after operation was 21 days. In the ruptured tube cases 13 were operated on as soon as possible on admission. Thirty-four were in an average of $5\frac{1}{2}$ days before operation and the average time in hospital after operation was 24 days.

Curettagé in Ectopic Patients.—Curettagé of the uterus was done in 37 of the 117 patients. Six cases showed a large uterine cavity. seven showed hypertrophied mucous membrane. Four showed shreds of decidual tissue. The only patient throwing off a decidual cast from the uterus was not curetted but expelled it spontaneously after the operation.

We now regard curettagé as of little help in the diagnosis and seldom curet the patients.

Posterior Colpotomy.—In cases of doubtful diagnosis a posterior

vaginal section is made. This was done in 47 of the 117 cases. Forty-six showed free blood, usually with clots, in the peritoneal cavity. In only 1 case was the diagnosis not verified by this means and when laparotomy was done this was found to be an intraligamentous rupture.

Dr. Coe has made it a practice to close this incision with a suture before opening the abdomen, thus eliminating the possibility of later infections by this route. We believe vaginal section to be a valuable means of deciding if the case is ectopic.

When to Operate.—The question of when to operate is an important one. Most of the cases of tubal abortion are not urgent, although a few are because of hemorrhage.

The patients with rupture of the tube are of a more serious type due to the great loss of blood and consequent shock to the system.

The writer is of the opinion that the safest procedure is to operate promptly when the diagnosis is made whether it is a tubal abortion or a rupture of the tube with severe hemorrhage. In this way we will avoid an occasional rupture in the ward with its severe symptoms, and the best interests of the patient will be served.

Previous Operations.—Three patients had salpingo-oophorectomy for diseased tube several years before. One patient had one tube and ovary removed at another hospital 3 months before and was not relieved of her symptoms till operated on here for ectopic. Two patients had previous ventral suspensions.

Operations for Ectopic Gestations.—Three patients had vaginal section only with gauze drainage, 8 patients had hysterectomy, 3 being supravaginal and 5 complete; 88 had ovary and tube removed for the ectopic, 13 had salpingectomy only, 5 had resection of tube only, a total of 117.

While resection of the tube has been done in this service 5 times, it is our belief that it is wiser to remove all of the tube, for several cases have been reported of ectopic occurring in the remaining portion of the same tube afterward.

Operations for Complications of Ectopic.—Thirty-two patients had disease of uterus and adnexa of opposite side, requiring operation, 2 fibroids in uterus, 4 had hematosalpinx in other tube, 1 being so large it was the cause of the hysterectomy, 11 had pyosalpinx or salpingitis, 2 had adhesions about tubes, 1 had an intraligamentous cyst, 6 had cystic ovary, and 7 had both ovaritis and salpingitis. These were operated on according to indications, some affording cause for hysterectomy, others for conservative or radical operations on tubes and ovaries. Four were operated on for backward displacement of uterus.

Thirty-four of the above patients had appendectomy, 5 because appendix was adherent to the gestation sac, 3 because of chronic inflammation, and 27 as a routine measure.

Recovery without Operation.—The question may be asked, "Do patients with ectopic recover without operation?" Undoubtedly some do recover, but many of them are not relieved of pain. This is shown by the history of case No. 110. This patient had severe pain at home for one month, the pain coming on during a menstrual period, and was then removed to a hospital with diagnosis of fluid in the abdomen. For this she was treated without operation for two months and improved. She went home. After some months she came to Bellevue out-patient department and a mass was felt in the tube. For this she was operated on. It proved to be an old blood clot, distending the fimbriated end of the tube, yellow in color, which the pathologist proved to be ectopic.

The second case No. 113 had a hard clot in the tube and the fimbriated end of tube was adherent to the ovary. Patient was under our care 3 weeks before operation and the tube was decreasing in size. This undoubtedly would not have progressed if she had not been operated on.

Complications after Operation.—Two cases of ruptured tube had pneumonia, one being followed by pleurisy with effusion, and recovered. Phlebitis occurred in 4 cases, one having it in both legs. Four patients developed pelvic abscess following operation and all were relieved by vaginal section and drainage.

Mortality.—Two patients died following operation; the first in 1900 and the second in 1908. The first patient was in an apparently septic condition when admitted, with high fever; a vaginal section only was done because of her condition. Autopsy showed she originally had a rupture of tube into broad ligament followed by a secondary rupture of a macerated and infected fetus into the abdominal cavity.

The second case was a private patient of the writer and was operated on 2 hours after first seen and 7 hours after the onset of first symptom. She had a very small opening in the tube where rupture took place and yet had the abdomen full of fluid blood, none of it being clotted. While the usual methods of transfusion and infusion were done the patient did not react and passed away next day. It is believed that the lack of clotting power in the blood had something to do with the result in this case.

After History of Patients.—Five patients are known to have been pregnant after the ectopic, one of whom miscarried at five months.

One was operated on for ventral hernia following the ectopic.

So far as we have known none of these patients have had any serious trouble in the pelvis after.

Two have been under our care for syphilis contracted after leaving the hospital.

This series of cases dates back seventeen years. The experience of those years has been of value to the visiting staff.

Patients to-day are not treated just as they were seventeen years ago.

In this study of our operative procedure we note that there is greater conservatism now about removal of uterus and adnexa.

Hysterectomy was done in 6 of the first 22 cases and in only 2 of the last 94 cases.

Vaginal drainage was done in 14 of the first 45 cases, and it was used in only 4 of the last 72 cases.

121 WEST SEVENTY-THIRD STREET.

A NEW AND ORIGINAL METHOD OF CALCULATING THE REQUIRED POSTERIOR SAGITTAL DIAMETER OF THE OUTLET IN A LATERAL CONTRACTION OF THE PELVIS.

BY

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STATISTICS have been published in this country by J. W. Williams and H. K. Thoms, which show the frequency of contractions of the transverse diameter of the pelvic outlet. They state this to be the most frequent contraction met with in white women. Williams also states that "the prognosis depends not so much upon the actual narrowing of the pubic arch or upon the distance between the tuber ischii as upon the relation between the latter and the posterior sagittal diameter."

He gives the following table and states that spontaneous labor would be exceptional with the following measurements (head average size).

Transverse of outlet	Posterior sagittal
8.0	7.5
7.0	8.0
6.5	8.5
6.0	9.0
5.5	10.0

It is known that as the transverse of the outlet is decreased the posterior sagittal diameter must increase in order to insure delivery

by the natural passages. There has been given no method of calculating just how much increase there must be.

I would like to suggest a method by which this may be readily calculated.

There is a triangular area of which the transverse of the outlet is the base, posterior sagittal the altitude, tip of sacrum the apex. The area of this I would call the index of the posterior plane of the outlet.

If we take Klien's measurements¹ as a working basis for practical purposes, using 10 in place of 9.95 c.m., we find that the index equals 55 (normal). It is possible to have an average size child born with no more serious operation than forceps if this is contracted down to 33.3.

The case having the smallest contraction of which I know is that reported by Slemmons, transverse of outlet 6.5, posterior sagittal 10.25; which gives the above index, 33.3 (forceps).

After measuring the transverse of outlet, the posterior sagittal required may be calculated by this formula:

x equals increase in posterior sagittal.

$$\frac{(10 + x) \text{ transverse of outlet}}{2} = 55 \text{ for normal relation between the two measurements.}$$

$$\frac{(10 + x) \text{ transverse of outlet}}{2} = 33.3 \text{ for a relation between the two, down to which a normal birth may be expected.}$$

Simplified the transverse of the outlet times the posterior sagittal divided by 2 should equal 33.3 or more, in order to expect natural birth (including forceps).

Transverse of outlet	Post. sagittal	Index of post. plane of outlet		Calculated post. sag. Lowest limit
8.0	7.5	30.0	33.3	8.33
7.0	8.0	28.0	33.3	9.5
6.5	8.5	27.6	33.3	10.25
6.0	9.0	27.0	33.3	11.1
5.5	10.0	27.5	33.3	12.12

With these figures (given by J. W. Williams)	With these figures calculated
spontaneous labor is exceptional.	by above method spontaneous labor should be expected.

¹ Transverse of outlet.....	11.0
Posterior sagittal.....	9.95
Anterior sagittal .. .	6.0
Anteroposterior.....	11.5

As observations are further carried out, I would not be surprised if these measurements become altered, but the method of calculating I believe to be correct.

Above is a table by this method of calculation, giving the lowest limit of the posterior sagittal in which normal birth may be expected in pelves of the same transverse of outlet as given in Williams' table.

247 SOUTH THIRTEENTH STREET.

MANAGEMENT OF PREGNANCY AND LABOR COMPLICATED BY HEART DISEASE.*

BY

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THE woman with an organic heart lesion differs from the normal woman in her relation to child-bearing in that the balance of her circulation is insured by a limited amount of reserve force. This latent power of the heart muscle which determines the circulatory capacity of the individual may be compared to a bank deposit, and it may be said that cardiac solvency depends upon the preservation of the integrity of this reserve. If the original deposit is large and the drafts upon it are small and infrequent, solvency is maintained. If the reserve is small and the drafts are large or frequently repeated, the account is quickly depleted and the patient becomes a cardiac bankrupt. Pregnancy and labor make drafts upon this reserve fund; but the size of the drafts depends upon the character of the pregnancy and labor, and upon the way in which they are managed. The physician becomes the trustee of his patient's cardiac reserve, and it is his duty to keep drafts upon it within limit that will insure its integrity. In order to do this he must estimate for every patient, first, the amount of reserve force which her heart possesses; and second, the probable size of the draft which pregnancy and labor will make upon it. As the reserve force of every heart is different and changes during the life of the individual, and as the character of every pregnancy differs in the demands which it makes upon the circulation, it is apparent that every case presents a problem which must be solved independently.

The estimation of the reserve force of the heart is a technical procedure. It is based upon the character of the lesion, the presence or absence of degenerative changes in the heart muscle and blood-vessels, the functional capacity of the kidneys, lungs, and digestive organs, and upon the past history and present condition of the circulation. Its value depends upon the accuracy with which it

* Read before a meeting of the Brooklyn Gynecological Society, April 7, 1916.

is made. Our first duty then in the care of a pregnant woman with organic heart disease is to enlist the services of an experienced internist.

The estimation of the size of the draft which pregnancy and labor will make upon the patient's heart is based upon the following data; her age and general condition, the functional capacity of her kidneys, digestive organs and lungs, the character and condition of her parturient canal, is she a primipara? if a multipara, have her past labors been easy? and finally her social and financial condition must be considered. If she be poor and forced to do her own housework and perhaps care for her children, the strain will be materially greater than if she be rich and have unlimited service at her command.

Having determined with as much accuracy as possible the foregoing factors, the obstetrician's problem is how to keep the size of the drafts within the limits of his patient's circulatory solvency. The standard practice which governs the treatment of pregnancy complicated by organic heart disease is summarized by Blacker in the advice to treat the heart disease without regard to the pregnancy until the break in compensation is seen to persist and then to terminate the pregnancy. The standard practice which governs the treatment of labor complicated by heart disease is to refrain from interference until signs of distress appear and then to end labor by operative means.

This plan would seem to work well from the obstetrician's point of view. The statistics of Blacker, French and Hicks, Fellner and others, show that the majority of women with compensated heart disease, go through pregnancy and labor without signs of decompensation.

But is it equally satisfactory from the patient's standpoint? It is a significant fact that the majority of fatalities occur not during pregnancy or labor but days, weeks, or months later. The obstetrician has not correctly gauged the size of the draft which he has permitted his patient to draw against her cardiac reserve, and she has been left a bankrupt. The statistics do not show this fact for they are based on hospital records, and corrected only to the end of two or three weeks postpartum. Is the obstetrician justified in concluding that his management of his case has been satisfactory when he delivers a viable baby from a living mother and dismisses both from his hospital service and from his thoughts at the end of two or three weeks? Has he not a further duty to perform, namely, to attempt to extricate his patient from her perilous position with the least possible diminution of her life expectancy? To accomplish

this result he must overlook no means at his disposal of reducing the strain of pregnancy and labor.

The means at the obstetrician's disposal for safeguarding the cardiac reserve of the patient may be discussed under the following headings:

1. Care during pregnancy.
2. Termination of pregnancy.
3. Prevention of future pregnancy by sterilization.
4. Protection of the heart from strain during labor.
5. Supervision and direction of the patient's muscular activity after labor.

1. *Care during Pregnancy.*—The cardiopath must be regarded as obstetrical cripple and watched with unceasing vigilance. She is more prone to toxemia than the woman with a normal heart and the functions of her digestive organs, skin and kidneys must be carefully looked after. Fresh air is of prime importance, for the oxygenation of her blood is below the normal. Her exercise should be carefully regulated to the capacity of her circulation. Her diet should be strictly supervised. Her lungs should be examined at frequent intervals. MacKenzie's sign of failing circulation, the presence of rales over the base of the lung of the side upon which the patient sleeps, should be recognized and its significance heeded.

2. *Interruption of Pregnancy.*—Throughout the course of every pregnancy complicated by heart disease, the necessity for the premature termination of the pregnancy must be borne in mind and its indications watched for. Blacker states: "I am of the opinion that there are more cases in which the induction of abortion or premature labor is good treatment than is generally supposed." The accepted ruling is that, when the signs of broken compensation persist in spite of appropriate treatment, the uterus should be emptied. At the first sign of failing circulation, the patient should be placed at rest and given appropriate treatment for the strengthening of her circulation. Here the aid of the internist is of the utmost importance. Should circulatory failure occur early in pregnancy, should it occur in a patient who has previously suffered from symptoms of broken compensation, or in a patient with mitral stenosis or with myocarditis, interruption of pregnancy is imperative; for under these conditions the cardiac reserve is so slight that one can be reasonably sure that it will not bear the strain of pregnancy and labor. If the signs of broken compensation appear later, and if the patient is young, if the heart muscle is healthy, if broken compensation has not previously existed, if the patient can be placed at rest

in a hospital, pregnancy may be allowed to continue with the hope of getting a viable baby, unless the symptoms persist or get worse. But, under these conditions, it should always be understood that the delivery must be operative and unaccompanied by muscular strain.

Before discussing the method of terminating pregnancy, I will consider the question of sterilization for the protection of the patient against the dangers of future pregnancies. The recuperative power of a heart that has suffered from broken compensation is always diminished. Especially is this true of mitral stenosis. It is diminished by age; by the presence of degenerative changes in the heart muscles, blood-vessels and kidneys. When it has-once occurred, its recurrence is to be anticipated. The indication for interruption of pregnancy may therefore be taken as the indication for the prevention of future pregnancies. To extricate a woman from the present peril, but to make no provision for protecting her from its return, is not good therapeutics. Neither is it wise to throw the burden of prevention of pregnancy upon the patient. The fear and anxiety which this entails cannot fail to have a most unfortunate effect upon her health. Most authorities recommend sterilization when the uterus is emptied by abdominal section.

If we accept the dictum that when interruption of pregnancy is indicated, sterilization is imperative, it becomes necessary either to modify the operative procedure by which we are accustomed to terminate pregnancy or to subject the patient to two operations.

Fellner and Hellendal recommend excision of a portion of the Fallopian tubes at a subsequent operation when the uterus is emptied by the vaginal route.

Anders recommends emptying the uterus by abdominal hysterotomy even in the early months of pregnancy; and resection of the tubes at the same time. He reports fifteen successful operations in advanced heart, kidney and lung disease.

The surgical procedures at our disposal for the termination of pregnancy are, induction of abortion or premature labor; dilatation and curetment, operative removal of the ovum by vaginal or abdominal hysterotomy, and Cesarean section. Induction of abortion is open to the objection that it is uncertain, slow and painful and, while it seems conservative, it is really not so, for it uses up more cardiac energy than the other methods that seem at first thought more dangerous.

Induction of labor may be indicated in certain multiparæ with relaxed and roomy vaginæ where short and easy labor is to be

expected, and where delivery can be quickly terminated if necessary.

Dilatation and curetment is limited in its application to the first two months of gestation. It is preferable to induction of abortion. Emptying the uterus by vaginal hysterotomy is the method preferred by many between the second and sixth months of gestation. It is better adapted to the conditions met with in multiparæ than in primiparæ. Emptying the uterus by abdominal hysterotomy has the advantages that it can be employed at any period of uterogestation, in multiparæ and primiparæ with equal ease and offers the opportunity of simultaneous sterilization. It is preferred to vaginal hysterotomy by Kriess, and by Anders who reports fifteen cases in which he has used it with success. Cesarean section is the operation of choice at or near term where the conditions are not favorable for an easy vaginal delivery, where the cardiac reserve force is slight, and where simultaneous sterilization is desirable. In our choice of a method we must be guided in every case by the conditions that are present. The period of uterogestation, the condition of the patient's circulation, and the relative advantages of the vaginal or abdominal route should be considered.

3. *Sterilization*.—When possible it is desirable to choose a method by which the uterus can be emptied and sterilization performed at one sitting. The abdominal operations have the advantage of permitting simultaneous sterilization. They suffer from the disadvantage of slightly added shock and increased risk of postoperative complications. The vaginal operations have the disadvantage that they are limited to the early months of pregnancy, are difficult in primipara, and necessitate a second operation for sterilization, unless local conditions are such that a simultaneous sterilization can be done by resection of the tubes through an incision in the anterior fornix.

4. *Protection of the Heart from Strain during Labor*.—No matter how slight the lesion from which the patient suffers, no matter how well she has passed through her pregnancy, no matter how much reserve force her heart muscle possesses, it is the duty of her attendants to reduce by every means available the strain of labor upon her circulation. For though she may possess sufficient reserve force in her heart muscle to carry her through a long and difficult labor, it would be criminally negligent to allow her to waste it unnecessarily, for upon its conservation depends the length of her life. The duration of labor must be short. Pain, anxiety, and muscular effort are exhausting, and must be reduced to the lowest limits. Expulsive efforts in the second stage must never be allowed. How then shall

labor be managed? When compensation has suffered but slightly or not at all during pregnancy, and when an easy delivery may be predicted, it will be safe to allow the patient to go into labor. The first stage should be conducted as painlessly as possible with the aid of morphine and scopolamine and with the patient in bed.

The second stage should be replaced by operative extraction under anesthesia. The third stage should not be hastened. After the third stage is terminated, a compress and tight abdominal binder should be applied. If in the first stage of labor, the heart action is embarrassed by pressure of the abdominal tumor as sometimes occurs in hydramios or multiple pregnancies, immediate relief may be obtained by rupturing the membranes and draining off the water. If the first stage does not progress as rapidly as seems desirable, it may be hastened by the use of dilating bags. It at any time during labor the circulation of the patient becomes embarrassed, rapid operative delivery under anesthesia is indicated. If compensation has suffered during pregnancy or a previous labor, if a prolonged or difficult labor is expected and the reserve force of the heart is slight, as in mitral stenosis or myocarditis, operative delivery should replace labor. Cesarean section should be the method of choice and sterilization should be performed at the same time.

Anesthesia and Analgesia.—Heart cases bear anesthesia better than pain and muscular effort. Hence some form of analgesia or anesthesia is indicated in every case. Morphine and scopolamine are ideal in many cases. By the progress of nerve blocking, they protect the heart from shock. They should always be used in some degree. Supplemented by local anesthesia when needed this method will adapt itself to the indications of many cases. Ether is well born unless there is a tendency to bronchitis or pulmonary edema. It has the disadvantage that it may cause vomiting or struggling. It should always be preceded by morphine. Local anesthesia is recommended by Webster, preceded by morphine, and supplemented by ether or gas-oxygen when necessary.

Medication.—The internist should determine the indications for medication before and during and after labor. His estimate of the condition of the circulation and the reserve force of the heart should be given due consideration when deciding upon the time and method of interference.

5. *After-care of the Patient.*—The need of appropriate medication, prolonged rest, and carefully graduated exercise, must not be overlooked. The patient should not be dismissed from observation

when her hospital convalescence is ended. She should be transferred to the care of her medical advisor.

The following cases have been selected as illustrative of some of the points which have been emphasized in the paper.

Pregnancy complicated by mitral stenosis allowed to continue. C. W., aet. twenty-four, in the third month of her first pregnancy, was referred to my service at the Brooklyn Hospital for consideration of termination of pregnancy. Her chief complaint was rapid heart action and nervousness. She had suffered from chorea when a child. She has had symptoms for one year. They have not become worse during the past three months. Examination by the internist showed a well-nourished woman, weight 103 pounds. Her lungs are sound. The functions of her kidneys and digestive organs are normal. She has no sign of circulatory derangement. Her thyroid gland is somewhat enlarged. Her heart is normal in size; left border 10 cm. from midsternal line. Right border at right sternal margin. There is a presystolic thrill at apex. Diastolic shock is felt over base. Her pulse is 100 to 120. Her blood pressure is 145 systolic 90 diastolic. Diagnosis, mitral stenosis with regurgitation.

In deciding upon a plan of treatment for this patient the following points were given consideration. Her heart lesion, mitral stenosis, is an unfavorable one. A blood pressure already above the normal and a trace of albumin in the urine still further complicate the situation. On the other hand, she is young. Her heart muscle is sound. Compensation is perfect. She is not any worse now than she was before pregnancy began. She will never be in a more favorable condition to carry a pregnancy to term. It is estimated that her cardiac reserve is sufficient for the strain of this pregnancy, provided toxemia of pregnancy can be avoided. If she goes through to term, it is planned to deliver her by Cesarean section and sterilize her at the same time, because she is a primipara and her heart reserve force is not estimated to be sufficient for a long labor, and because it is desirable to sterilize her, as the care of more than one child would be a greater burden than her heart could bear.

2. The following case shows how the reserve force diminishes with age and frequent pregnancies, and how the burden of an abnormal pregnancy or difficult labor will break the compensation which has been sufficient for a normal pregnancy and an easy labor.

Mrs. A. M., admitted to the Bushwick Hospital on Jan. 24, 1916, in labor at the end of the eighth month of her thirteenth pregnancy. She has pains every five minutes. She suffers with dyspnea, orthopnea, dizziness, and spots before her eyes. Her respiration is rapid and labored, her color is dark, her lips and nails blue, her limbs and face swollen, her abdomen enormously distended. Her heart is enlarged to right and left. The apex beat is diffused. There is a loud blowing, systolic thrill at the apex transmitted to the axilla. There are sibilant sonorous rales over the chest, and many moist

râles over the bases of the lungs. The uterus is large, tense, and greatly distended. The perineum is relaxed, vagina roomy, cervix soft, thin, and dilated three fingers. Membranes tense and bulging. She had rheumatism when young. Otherwise good health. Has had no heart symptoms until the present pregnancy. Has had twelve easy labors without cardiac distress. At the sixth month of the present pregnancy she suffered with dyspnea, edema of limbs, and precordial pain. She recovered after three weeks in bed.

Diagnosis.—Labor complicated by mitral incompetency with broken compensation.

Treatment.—She was given morphine and scopolamine and digalin by hypo, and the membranes ruptured. A certain amount of relief was obtained in this way. She was kept under the influence of morphine and scopolamine, the heart supported by large doses of digalin and she was allowed to proceed. After four hours she was delivered of triplets. She made a normal convalescence. Her heart rapidly regained tone. She left the hospital in good condition. She now does her own housework without dyspnea.

3. Operative delivery and sterilization are indicated where decompensation has occurred in previous labors.

R. S., aet. twenty-four, was referred to my service at the Brooklyn Hospital in the ninth month of her second pregnancy, on April 13, 1914. She suffered from dyspnea, headache, sleeplessness, and spots before the eyes. She had had rheumatism when sixteen years of age. She was sick for six months at that time. She has had dyspnea ever since. When her first baby was born, interference was needed on account of weak heart action. Since the beginning of this pregnancy, the dyspnea has been worse. She has been in bed for several weeks under treatment. Physical examination by an internist showed her heart enlarged to the right border of the sternum. The left border was 4 inches from the midsternum. There were no murmurs; the second pulmonic was accentuated. The rate was 130. The blood pressure was 95 systolic and 76 diastolic. The pulse was regular.

Diagnosis.—Pregnancy ninth month complicated by rheumatic myocarditis.

In view of the fact that she had had trouble with her heart during her first confinement, and that she is now in a much worse condition than she was then, it was thought that she would not go through a second labor without considerable risk of life and almost a certainty of doing irreparable damage to her heart muscle. Therefore on the nineteenth day of May she was put to sleep with morphine and hyoscine, taken to the operating room, and under light ether anesthesia, delivered by Cesarean section. Her tubes were excised at the same time to prevent future pregnancy. She stood the operation well. She made a normal convalescence. Her heart improved rapidly. She was discharged on the sixteenth day postpartum, improved. Her baby lived. Her doctor reports that she is in good condition now. She does her own housework. She has no dyspnea and sleeps well.

4. Early termination of the pregnancy is often necessary to save life. The following report illustrates the course of such a case.

R. C., aet. thirty-one, was referred to my service at the Brooklyn Hospital, Jan. 28, 1911. She complained of dyspnea, orthopnea, marked swelling of extremities. She was in the seventh month of her third pregnancy. Seven years ago, shortly after her second child was born, she contracted acute articular rheumatism with endocarditis. Nine months ago she had a recurrence. Since that time she has had dyspnea on exertion. Since the pregnancy began, the dyspnea has been steadily increasing. For a month she has had marked swelling of legs. She has been in bed a week. She has received cardiac tonics and restricted diet without improvement of the symptoms. On admission she presented the picture of advance cardiac decompensation. She was cyanotic. Her breathing was rapid and labored. She could not lie down in bed. Her pulse was about 100 while at rest and of poor quality. Her heart was enlarged to right and left. There was a rough systolic murmur at the apex, transmitted to the axilla. The bases of both lungs showed marked edema. The urine was scant but normal.

The diagnosis of pregnancy in the seventh month with chronic endocarditis and mitral insufficiency with advanced decompensation was made. She was given heart tonics and kept at rest for a week without improvement. Labor was then induced by inserting a tube in the uterus. She was given small doses of morphine and hyoscine and large doses of digitalis. After six hours of pains a small fetus was delivered. During the labor the pulse ranged between 110 and 130. The baby was stillborn. The puerperium was uneventful. Compensation returned to some extent. When she was transferred to her home under her family physician's care, she was comfortable in bed. She could lie down or sit up without dyspnea. Her doctor reports that she now does her housework but has slight dyspnea on climbing the stairs. The ultimate prognosis for this case is bad. She should not be allowed to become pregnant again. If she becomes pregnant, the uterus should be emptied as soon as the diagnosis is made, by an anterior hysterotomy and the tubes should be resected through the anterior fornix to absolutely insure against a future pregnancy.

5. Frequently the kidneys are involved as well as the heart, and the indications for termination of pregnancy becomes imperative. The following case combines the clinical features of heart and kidney involvement.

A. D., aet. twenty-eight, admitted to my service at the Brooklyn Hospital April 24, 1914, in the beginning of the ninth month of her fourth pregnancy, suffering with dyspnea, orthopnea, edema of the limbs. She had acute articular rheumatism eight years ago, and has had dyspnea on exertion ever since. Her symptoms have been growing worse since the early months of this pregnancy. She had been in bed for several weeks. The examination reveals marked

edema of legs, pulsation of the veins of the neck. Visible heart beat $4\frac{1}{2}$ inches to left of midsternal line. Right border of heart is at right sternal line. There is a rough systolic murmur at apex transmitted to the back. The blood pressure is 208s. and 120d. The urine is scant, sp. gr. 1010, contains albumin and granular and hyaline casts.

Diagnosis.—Pregnancy ninth month, complicated with mitral incompetency of rheumatic origin. Secondary nephritis. Indications:

- a. To terminate the pregnancy.
- b. To support the heart during the labor.
- c. To reestablish compensation.
- d. To treat the nephritis.

After a week of rest, tonics and eliminative measure, induction was done. On March 31st, at 10.45 A. M. a bag was inserted, the patient returned to bed. At 3 P. M. of the same day the membranes ruptured. Five minutes later the baby was delivered spontaneously. The patient's condition during labor was good. The puerperium was normal. Compensation returned. She left the hospital in good condition. She has not consulted her family physician since. The prognosis in this case is made worse by the kidney condition. If she becomes pregnant again, it will be justifiable to terminate the pregnancy as soon as the diagnosis is made, and do an operative sterilization.

6. In mitral stenosis the margin of reserve force in the heart is small. Compensation is easily disturbed. When it is once broken, the danger of a fatal termination is greatly increased, and the patient must be guarded against every form of exertion and excitement.

M. K., aet. twenty-seven, admitted to my service at the Brooklyn Hospital on Nov. 12, 1912, in the seventh month of her second pregnancy. She suffered with dyspnea, orthopnea, cyanosis, and edema of the legs. She had rheumatism when a child. She had never been strong. She has a small flat pelvis with a contracted outlet. She had lost her first baby during an operative delivery some years ago. Since the fifth month of the present pregnancy she has suffered with dyspnea. She has been in bed under treatment most of the time since then. She has already declined to have the pregnancy interrupted. She has had one serious attack of pulmonary edema, about a month ago. Physical examination by the internist shows a mitral stenosis with a broken compensation. The bases of both lungs are congested. She was kept in bed and given heart tonics. She improved gradually. She was allowed out of bed on the 29th of November, but had to return at once on account of rapid heart action and severe respiratory distress. On the 9th of December she got out of bed without permission, and the effort brought on an attack of acute pulmonary edema. Her pulse during this attack went to 160. She became badly cyanosed and lost consciousness. She recovered after venesection. In view of the fact that she could not sit up without danger of death, it was deemed

inexpedient for her to be allowed to go into labor. In view of the fact that she had a small pelvis, it seemed best to deliver her by Cesarean section. Her pulmonary edema made ether an unsafe anesthetic. It was, therefore, decided to operate under morphine-hyoscine and local anesthesia. She was given one H. M. C. tablet on the evening before the operation. She slept all night. She was still drowsy in the morning when she was given a second tablet. She fell into a sound sleep and two hours later was operated upon. She stood the operation well. At no time was she in any danger. Her pulse was slower when she returned to the ward than when she went to the operating room. Her baby lived. She improved gradually, and was dismissed from the hospital on the thirty-fifth day postpartum.

She was sent to an institution where she could be watched and protected from strain. She is now so well that she is able to support herself and baby by manual labor. At the time of the operation her tubes were resected so she is in no danger of another attack of broken compensation from pregnancy.

CONCLUSIONS.

1. The problem of the management of pregnancy and labor complicated by heart disease must be solved independently for every case.

2. It is based not on the character of the lesion alone, but upon the relation of the reserve force of the heart to the amount of strain which the pregnancy and labor under consideration will make upon it.

3. That by the combined efforts of the experienced internist and obstetrician, much may be done, not only to reduce the immediate mortality but to lessen the subsequent morbidity.

4. That operative deliveries are conservative in that they save the reserve force of the patient.

5. That sterilization is indicated more frequently than it is practised.

6. That an immediate mortality of 12 to 50 per cent. as is variously reported, is too high, and is due to tardy recognition of the condition, unwise delay in terminating pregnancy, and the use of too conservative methods in the management of labor.

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167 HANCOCK STREET.

PREGNANCY COMPLICATED BY CANCER OF THE CERVIX.*

BY

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It is fortunate indeed that pregnancy in the cancerous mother is of rather rare occurrence. Pregnancy is even comparatively rare in women suffering from extragenital cancer, both from the fact that the disease usually affects those past the menopause, the highest percentage being between the ages of fifty and sixty, and also because the anemia and cachexia, as a rule, suspend menstruation and ovulation. Likewise the irregular, bloody, and almost continuous acrid and fetid discharge, and the occlusion of the canal by the growth, militate strongly against conception. Therefore the patients who show this complication are those in whom cancer develops early in life, and in these young people the disease is particularly rapid and malignant.

There are now few who dissent from the general proposition that the occurrence of pregnancy in a woman suffering from any form of malignancy has a tendency almost always to hasten the ravages of the disease. The same is true of tuberculosis or any wasting disease, and is more generally the rule in growths of the breast and uterus, on account of the increased blood supply in these organs during gestation. The already wasted system is unable to stand the burden and strain of prolonged gestation, and there results either a spontaneous interruption of pregnancy, or, if nature fails to come to the rescue, the pregnancy continues at the expense of the debilitated system, the growth makes rapid advance, and the woman shortly succumbs. This was demonstrated to me lately in a lady who came under my care, who developed a cancerous growth in the breast during her fifth pregnancy. It was first noticed at the seventh month and grew very rapidly. It was removed during the eighth month by a radical

* Read at a meeting of the Brooklyn Gynecological Society, April 7, 1916.

operation. I delivered her at term of a small but healthy child, but she died of a recurrence of the growth in eighteen months.

During the puerperium growths of the cervix advance even more rapidly than in the months the fetus is in the uterus. This is well recognized but not very satisfactorily explained, unless it be influenced by the general weakness usually experienced for a few weeks after labor.

Cancer of the cervix complicating pregnancy occurs probably once in about 1200 cases, although there is a wide variation in the figures of different observers. Cohnstein, Olshausen, and G. H. Noble have collected a series of cases abroad and in this country. In the records of the last 3000 cases in the Low Maternity of the Brooklyn Hospital, it occurred twice. The growths are about equally divided between adenocarcinoma and the squamous-celled carcinoma. Some of the older obstetricians inclined to the belief that carcinoma of the cervix did not have much material effect on the course of the pregnancy, and that while abortion might result, it was not as frequent as might be expected, this is due to the fact that the growth confined to the cervix does not interfere with the expansion of the uterus. Of Cohnstein's cases only 29 per cent. had a premature expulsion of the fetus. All of these writers noted the fact that gestation may be prolonged much beyond the usual limit.

The threat or occurrence of abortion or miscarriage may, in some instances, lead to the discovery of the disease. This is shown by the following case history, occurring in my service at the St. Mary Hospital.

Mrs. A., Italian, thirty-seven years of age, the mother of six children, was admitted to the St. Mary Hospital suffering from irregular spotting of six months' standing. Her baby was two and one-half years old, her previous health had been robust, and her labors easy. She began by having two months of irregular, bloody discharge and a little, thin leukorrhea. She frequently noticed a bloody discharge after coitus, but no pain. She had not lost appetite or weight. She missed here regular periods for two months and then began a bloody discharge at intervals of six to seven days, until her admission to the hospital. Three days before admission she began to have some cramps in the lower abdomen and greatly increased hemorrhage, and was sent in with diagnosis of threatened miscarriage. Examination showed an enlarged and congested anterior lip of the cervix, the appearance of which was shiny and smooth. The posterior lip was very much enlarged and springing from it was a growth of cauliflower appearance extending into the edge of the vagina on the left side. The os was patulous and admitted the tip of the index-finger. The body of the uterus was not very freely movable, soft, and the size of a four months' ges-

tation. As miscarriage appeared imminent and hemorrhage was quite profuse, the vagina was tightly packed with gauze. The following morning the packing was expelled together with the products of conception. For several days the bleeding was free but not excessive and did not require packing. At the end of two weeks the uterus was fairly well involuted, but tender and of limited mobility, and a small mass was palpable in the left broad ligament. On account of the evident invasion of the disease beyond the limits of the cervix proper, I decided to do a hysterectomy rather than a Byrne operation. The cervix was freed from the vagina as much as possible with the cautery knife and the pouch of Douglas was opened. Then the abdomen was opened above and the operation completed by the usual method of panhysterectomy. Her recovery was good and she left the hospital in good condition, and my hopes were high for a complete cure. Within eight months she had a recurrence and died within the year with general involvement of the remaining structures in the pelvis.

It seems hardly necessary to say that in this condition the prognosis is extremely grave. One writer (Charpentier) says that if pregnancy develops during cancer of the cervix it has a favorable influence upon the disease, but if cancer has its beginning after conception, the disease makes rapid progress. The dangers at delivery are measurably increased from hemorrhage, rupture of the uterus, and sepsis. Cohnstein's mortality was 12 per cent. in mothers and 39 per cent. in children going to delivery at term.

The *diagnosis* should be easy if the case is seen early, but the same delay in examination is experienced here as in uncomplicated cases of uterine cancer. Women having a monthly flow during pregnancy should be looked upon with suspicion, and rigidly investigated. The disease might be mistaken for placenta previa or small accidental hemorrhage.

Treatment.—Early months. Cullen in his book on cancer of the uterus epitomizes a short chapter on cancer of the uterus and pregnancy as follows: "Whenever an operable carcinoma of the cervix is detected a radical operation should be performed at once. By delay we shall probably sacrifice the mother's life and at the same time have only a limited chance of saving the child." This probably expresses the views of most of the gynecologist-obstetricians of the present time, provided the gestation is under four months. However, few will fail to be guided by the views and wishes of a mother anxious for a living child, who is willing to assume the explained risks she is incurring in carrying her child to term. Vaginal hysterectomy at this time seems to be the method of choice. The induction of abortion or premature labor as a preliminary to

radical operation I hold to be not permissible owing to the grave risk of sepsis and hemorrhage. If the uterus has successfully emptied itself and been followed by fair involution, and only if the disease is strictly confined to the cervix, has the Byrne operation any place in the treatment of cervical cancer at this stage.

Later Months.—In the American Text-book of Obstetrics, Davis states that if the patient is seen for the first time advanced beyond four months, delay may be advised in the interest of the child, provided the tissues about the uterus do not become involved. In the latter case, viz., involvement of periuterine tissues, I am thoroughly in accord with Coe when he states that the interest of the child is then paramount, as the permanent cure of the mother is improbable and the child may be saved. Amputation of the cervix by any method, or scraping away of diseased tissue, as a palliative measure, at any time during pregnancy, as advised by some, I consider impossible, without inducing miscarriage and probable sepsis, which are dangerous.

If conservative treatment is decided upon on account of the far advanced disease, or in the child's interest, it will take the form of styptic and cleansing applications to the diseased cervix.

Of the methods of delivery at or near term the best is Cesarean operation, followed immediately by panhysterectomy. In this we fulfill the double indication of getting a viable child, and take the best measures to cure the disease and prolong the life of the mother. If the disease has advanced so far as to be classed as inoperable, where the bladder, rectum, or parametrium has been involved, it would probably be best to deliver by Cesarean, allow the woman to take her chance with sepsis and later subject her to treatment by the Percy method.

This typical case occurring recently in the gynecological-obstetrical service of the Brooklyn Hospital well illustrates some of the points in clinical history and treatment.

Mrs. L., service No. 3620, an Austrian, thirty-eight years of age, was admitted to the Low Maternity on the service of Dr. A. A. Hussey, January 14, 1914. She had had four normal labors and the puerperia had not been complicated. She had no irregular bleeding or leucorrhea, had had a regular monthly flow of blood and did not suspect pregnancy until quickening occurred. She did not consult a physician until labor began a little before the eighth month when she was immediately referred to the hospital. Examination at that time showed a well-nourished woman, normal heart, lungs, kidneys, and liver. The abdomen was protuberant and soft and the uterus enlarged to about seven and one-half months. Vaginal examina-

tion revealed a parous outlet and vagina, the cervix was hypertrophied, with a hard ring about the cervix nearly $1\frac{1}{2}$ inches thick, and thicker in the anterior than the posterior lip by about $\frac{1}{2}$ inch. It had a hard, cartilaginous feel, but was not broken down. The head was at the inlet and she was having hard uterine contractions every two minutes. On account of her inability to dilate the cervix after six hours of hard labor, and in the presence of evident malignancy, it was decided to deliver her by the Cesarean operation. This was done in the usual manner, except that the entire uterus was delivered from the abdomen before the child was removed. The child was a female and weighed 4 pounds, 12 ounces. After removal of the placenta a few sutures were inserted in the incision in the uterus and a pan-hysterectomy proceeded with. The bladder was separated in the usual manner from the cervix and vagina, and the entire uterus and about 1 inch of the vagina were removed. The vessels were ligated, the raw surfaces covered and a vaginal pack inserted below the peritoneum. On examination the specimen was pronounced epithelioma of the cervix. The woman made a good recovery, except for a slight wound infection, and is reported in good condition at the present time.

In the treatment of these cases even after viability, we must not lose sight of the feasibility of the vaginal Cesarean operation, followed immediately by vaginal hysterectomy. While we have had no experience with this procedure it would seem that it could be accomplished with less difficulty than it would appear to involve. In the vaginal Cesarean operation we have noticed how easily the bladder is separated from the vagina and cervix, also how readily the uterus comes down to the outlet after delivery of the child. Fritsch brought out this operation when he did a vaginal hysterectomy for cervical cancer immediately after delivery of a child at term by forceps. He says the operation is done with ease and the surrounding tissues are readily recognized; the uterus stretched to an enormous length during removal.

From the study, then, of our two cases, we might be allowed to conclude:

1. That a routine examination of every case early in pregnancy would result in the diagnosis of cancer of the cervix, if present.
2. That women having atypical bleeding during pregnancy, as well as those having a regular monthly flow of blood during gestation should be regarded with suspicion and rigidly investigated.
3. That if discovered under four months the consensus of opinion is that radical operation be advised after the true state of affairs has been made known to the patient and her family.
4. That if discovered after the fourth month the child may be

allowed to go to viability and then an abdominal or vaginal Cesarean operation performed, followed immediately by panhysterectomy.

5. That the induction of abortion or miscarriage as a palliative measure is not permissible.

271 STUYVESANT AVENUE.

THE TEACHER'S INHERITANCE.*

BY

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Mr. Chancellor, Members of the University, Trustees of the Magee Hospital, Ladies and Gentlemen:

This is for me a great occasion—a great pleasure, a great honor, and a greater responsibility. I may thank you for the pleasure, and I do thank you for the honor, I cannot thank you for the responsibility. My thanks are respectfully tendered to your great university, and to the Board of Trustees of this hospital whose work we are come to inaugurate.

We are here to-day to celebrate the opening of the Magee Hospital and in these introductory exercises we, each one of us, are proud to participate. Such a celebration marks always two things, it marks a present achievement, and a promise of things to be achieved. A great thing has been done. This splendid hospital has been built and equipped, and there remains for the future the great work, the great life-work, which it is to do. Accordingly, we stand to-day in this inauguration at the division-point between preparation and accomplishment, between promise and fulfilment—in the present between the past and the future. On such occasions our first privilege and our first duty I take it, is always to remember the past; to be not unmindful or forgetful of the work of those who have gone before. So it is that the names of the Honorable Christopher Lyman Magee, and that of his mother Elizabeth Steel Magee, are continually in our minds to-day. This hospital is essentially the work of their hands and their hearts, and through all the many years which it shall live, and in all the great work which it will do, these two names shall be specially remembered. For the hospital and its work will always remain for these two, the mother and the son, a great memorial. There is something peculiarly appropriate, I think, that

* Address delivered at the dedication of the Elizabeth Steel Magee Hospital, Pittsburgh, October 27, 1915.

this hospital, the gift of a mother through her son, should be devoted to the service of women—to the great mother service. It is somewhere written that the highest service which one generation can bequeath another is that of a mother to her son.

We remember also with gratitude and appreciation the wisely-advised and well-ordered efforts of the several trustees of this behest. I can imagine no more onerous or self-denying ordinance than that of a trustee. Often it is, alas, an unsatisfactory and a thankless business. In the present instance, however, only our highest appreciation and our best thanks are due. I heartily congratulate the thirteen gentlemen who so successfully have in this institution embodied, not only the spirit, but also the letter of the final testament. "There shall be admitted to this hospital all females who may apply thereto for lying-in purposes," reads one clause in the Will. Considering rather the spirit of this instruction, the Trustees very wisely, I think, have widened its scope. It is a Lying-in Hospital, but it is more than this. For not only is it to care for the woman during her pregnancy and parturition, but it is to minister to her in all the many ailments and disabilities to which her motherhood, actual or potential, renders her liable. Accordingly the Elizabeth Steel Magee Hospital is a hospital devoted exclusively to women. And, in its care of these, its tradition is, I am thankful to say, the old tradition written long ago in the dust, the lesson of that great charity, "he that is without sin . . . let him first cast a stone."

The Magee Hospital needs no description from me. The hospital itself, its aims and aspirations, have been admirably set forth by the several speakers this morning. Best of all, in no uncertain words, it speaks for itself. In very truth, it is the latest word in hospital architecture, and is, I think, the best and the most complete clinic of its kind in the world to-day. This plain statement makes the highest praise.

And this hospital is a gift, not only to the public which it serves, but to the medical profession that serves it. In the most complete sense it is a double gift; for in benefiting the one—the public—it of necessity benefits the other—the profession. And again, in a large and special sense it is a bequest to general medicine; for while it is natural and true that it profits first the profession of Pittsburgh, to some extent this profit is shared by the whole profession throughout the world. Accordingly we, the disciples of medicine how-so-far scattered, are of this legacy the residuary legatees. We feel assured that it is held by us, and for us, as a sacred trust; we know

that it shall profit us only if we give good and faithful account of our stewardship.

Let us say at once, then, that we are specially grateful; and in the name of the profession, let us say, and re-say it, that we are grateful especially that this hospital is a teaching school. On its cornerstone we are thankful that we may read, "For the Healing of the Sick, and the Proper Teaching of the Healers of the Sick." By this teaching, not only is the measure of its work and usefulness enormously increased, but for this very reason there is a secure guarantee that this work will be adequate and progressive. The fact that a hospital is a teaching school is in our day sufficient to save its soul.

In a very special sense, and under new and ideal conditions, this hospital is to teach. It will care for and heal the sick, and will do this better, more faithfully and conscientiously, from the very fact that it is teaching others to heal the sick. In all this work, the healer will be the teacher, and this is as it should be. Such a hospital constitutes for the teacher no small part of his inheritance. Its bequest to him is generous, and in all equity its demands of him are great. True, it is only part of his inheritance, the material part; it is the body of his inheritance which, if it be a living body, must be quickened by that greater part, the spirit, the animus, or the soul. It is of this complete inheritance—the body and the soul—that I now wish to speak.

It is of course the medical teacher who chiefly concerns us.

Even in a scholastic sense we live in troubled and heart-searching times, for things are by no means right in an educational way. For the last two decades education in general, and medical education in particular, have been subject to revision and repute. Everywhere there has been academic unrest and dissatisfaction. Several of our universities have already encountered almost a Mexican Revolution and the general professorial peace, peradventure the slumber, has been grievously broken. It is our educational system that has been, and continues to be, at fault; and the whole movement is an impeachment of our pedagogic methods.

The Carnegie Foundation for the Advancement of Teaching and Lord Haldane's Commission on University Education, have been in the English-speaking world, portents of the coming reformation. Whereas of the reformation itself, the formation of the American College of Surgeons has been, perhaps, the most conspicuous feature. Already there has emerged a growing realization of the momentous

importance of the profession of teaching. For only slowly and at this eleventh hour, are we coming to regard it as the greatest and the most important of all the professions. At last the teacher, the trained, living professional teacher, is in sight of his own. From first to last the quarrel has been with old traditional methods of teaching, methods from which the life has long since departed, and which can be safely numbered with the dead. And, as in other reformations, this is but an effort, a determination, to bring all teaching, and the teaching profession, into closer contact with living things, with the actual realities of life. The whole experience is dynamic; for all these things, the criticism, the unrest, and the change, are but a *stirrage*, a sign of coming life.

Medical education, especially in America, has experienced to the full this pedagogic renaissance. In all our medical schools there has been, not only growth, but indications of greater growth. Medical education to-day is not of the same number, street, or city as it was even ten years ago. And the change, I take it, is assuredly for the better, and the movement is only at the beginning.

Abraham Flexner, a great educationalist, has told us that in the United States "medical education includes something of which is best, and all of what is worst to be found among civilized nations." He has very ably compared the German school of medical education with the English school, has amply demonstrated their respective merits and defects, and has definitely indicated that America should profit from them both. We are to build our own educational system, and here as in all building, a right selection of the materials is all-important. According to Flexner, the one point of real superiority in American conditions is their great plasticity. The whole educational world is before us, and we may make of our own institutions exactly what we wish. It is for us to work out our own system, our own academic salvation.

There are, it is true, many faults in our medical education, but I think it may be said that, even in these very faults, perhaps by very reason of them, there are strong and imperious indications of virility and growth. We may not always be quite sure where we are going, but we know we are on the way.

And all this activity makes for a sign in medical education. It is the very spirit of the times in which we live—the *Zeitgeist*.

And our modern medical teacher is alive to all this. For it is or should be the mainspring of his conduct, the very spirit and inspiration of his inheritance. It is of this inspiration, of this spirit that I shall first speak.

I. The Teacher's Spiritual Inheritance.—The teacher who inherits must show good and sufficient proof of his inheritance, and this must, of necessity, become articulate in him in a twofold way:

(1) The effect in himself as an individual unit, as a teacher; and
(2) Its influence upon him as a university colleague in the correlation of his work.

(1) The effect in himself as an individual unit, as a teacher.

It may be true that a good teacher is born and can scarcely be made; it certainly is true that he is not nearly so numerous as he professes to be. I undertake to say that not one of you has met the man, or the woman, who confessed himself a bad or even an indifferent teacher. Whatever else we can or cannot do, it is a universal obsession that we can teach. For in a sense teaching is merely the giving of advice, and in this the high Gods attest a world-wide proficiency. Accordingly, there is much ground for Shaw's borrowed aphorism, "those who can, do; those who can't, teach." Moreover, as regards our university positions, we, good, bad, or indifferent teachers, hold our positions for life, or during a very moderately good conduct. I have heard it said that it is very difficult for a family to change its physician; I know it is almost impossible for a university to retire a professor. So, speaking generally for the universities in America, they must accept us in our life-times, for there is no getting rid of us.

While it is not given to us all to be good, it is certainly given to us all to be better; and a definition may be of service just here. The definition is this: A good teacher is one who is the embodiment of the experimental or scientific method, and whose teaching makes for power rather than for mere information.

Professor Richard M. Pearce, of Philadelphia, in an address delivered some three years ago, has very forcibly pointed out the importance of the experimental method in the everyday work of the teacher, and its great possibilities in the development of both the science and the art of clinical medicine. This able address must be for all teachers, and especially clinical teachers, an inspiration. Its whole substance may be summed up in Samuel Butler's famous phrase, directed to the student: "Don't learn to do, but learn in doing." It is only in doing that the student can develop power, can truly learn. This is the principle that should inspire and animate all our teaching, and all our intercourse with students; for, failing here, our best efforts do nothing but conspire toward their intellectual death. Accordingly, the full understanding of this fact, and

the adoption of such a method, is no small part of the teacher's spiritual inheritance.

Though the great truth of the coördination of head and hand was enunciated more than a hundred years ago when Novalis said: "We only know in so far as we do—and make," its general application to medical education has been long delayed. It is, however, the breath of the modern spirit, and there is no doubt that we owe its advent to the laboratory and to methods of research.

In accordance with this modern method the teacher engages the student, from the beginning to the end, in research, and there is no end. For the student this research begins rightly enough with himself; with his own mental processes, in order that he may learn his natural bent, may come to know his own mind and the peculiar individual way in which it works. Even here he learns in doing, for he is only carefully encouraged and directed. And this experimental, this inductive method, he then turns upon his work, and systematically applies it to the problems of the whole curriculum. For this method is not only for the preliminary—the so-called scientific subjects, but especially for all the later, larger, and more complex problems of his clinical work. It is in diagnostic methods, and in the recognition and treatment of disease, that it reaches its chief attainment. It is in very truth the method of a life-time—the life-time method.

And it seems to me that this should represent both the limits and the scope of undergraduate research. In all conscience both are wide enough to suit the most talented and the most ambitious. None save the very exceptional student—and I have never met him—should in his undergraduate days be urged, or even encouraged, to undertake a so-called "original research." This is in my opinion an educational blunder, for he who builds well makes first his foundations broad and sure.

Again, medical teaching is to heal the sick, and this must never be forgotten; this is its aim and we simply remind ourselves that this has been through all the ages its great tradition. From first to last, in word and deed, it is the whole spirit of our inheritance. And this tradition is specially strong to-day, for in Heaven's name, the present world has need of us. It is this humanitarian spirit that always must inspire our teaching work, for, while we coördinate the head and hand, we must not forget the heart. These three, the head, the hand and the heart, make the complete trinity of the man; and in the laboratory or at the bedside it is these three we teach.

So, by all these things, the individual teacher shall be known as

being really possessed of a spiritual inheritance. "What you are thunders so loud I can't hear what you say!" There will be with his inmost self-repeated communion, a general stock-taking of his teaching gifts; for however painful the process, the time is ripe for self-criticism and self-knowledge. As a teacher he will obtain inspiration and assistance from his fellow-teachers; and he will do in his own department his level best. And at the last his school shall say of him, not only was he a teacher, but pure scientist or clinician, he was a man. "Ripened in wisdom, walking as a physician;" he was articulate of his spiritual inheritance.

In illustration thereof there arises naturally before us the remembrance of Charles Sedgwick Minot, whose untimely death occurred nearly a year ago. When we contemplate the department of comparative anatomy in the Harvard Medical School, and recall what this has meant to scientific medicine in America, it is almost impossible to believe that in 1880 Minot began here with eighteen microscopes and an annual appropriation of fifty dollars. Once again, truth is stranger than fiction. In the highest sense Minot was a good teacher, and a conspicuous embodiment of the spirit of his time. The inspiration of his example is no small part of the American teacher's inheritance.

(2) Its influence upon him as a university colleague in the correlation of his work.

Not a single teacher but the several teachers of the faculty make the school; it is a joint, or jointed, work. If the teacher be thoroughly imbued with the spirit of his time, and be not blind to his inheritance, he will, in managing his own department, unselfishly consider the interests and the needs of the whole curriculum. In sporting phrase, this is team work; in the business world, it is organization.

Speaking generally, our medical faculties are far too large, in each we suffer from a plethora of teachers, and the educational method has become special and isolated. It is but human nature to magnify our own importance, and somewhat to overlook the value of others. There is, so far as I know, no medical faculty not surpassingly rich in human nature. The very constitution of these faculties has been partly responsible for this; for the service of the professor is often largely voluntary, there is no central government, and each in his own department is a law unto himself. I believe that government by democracy, even when bad, is the most advanced government; in its highest form, as an efficient commonwealth, it demands much from the average man. Our medical faculty is essentially a democ-

racy, and I trust it will ever remain so; accordingly its demands from the average teacher are great. For as a teacher, not only must he do his own work well, but he must subordinate his work, coöperate on every side with his colleagues. His own work is no longer to be insular and egoistic, but is to be by his own efforts completely merged into the general whole. Such a man must of necessity maintain close comradeship with the work of his colleagues; general results will become visible; and of necessity there will ensue a right proportion. In this way the general and the special work will quite naturally correlate itself. No longer will the class-room be utterly ignorant of the laboratory, and the laboratory be as a stranger in a strange land. Instead there will be secured that complete unity which alone makes for efficient work. Nothing is work in any faculty than incessant quarrel; and a wrangling colleague is a perpetual nuisance.

In this model faculty the curriculum would represent a mutual policy for which all would be more or less responsible. The wide and lamentable chasm between the hospital and the laboratory, the so-called pure scientist and clinician would be forever bridged. Each would know the method of, and borrow from, the work of the other. For they both are concerned more or less closely in the great service, and that service is the healing of the sick.

All this may sound somewhat Utopian, but it is after all only the promise of our inheritance. The medical faculty of the future and of the near future must achieve some such unified and cohesive method. If we do not do it ourselves, we will be ignominiously compelled to do it; and though I remember that in any organization reform comes hardly from within, but is usually of the nature of a compelling force from without, the promise of this self-reform is the very vital part of the teacher's inheritance.

II. The Teacher's Material Inheritance.—The richness of this inheritance is well exemplified in the institution which we open to-day. I can imagine no fuller and more soul-satisfying legacy than that to which Professor Ziegler is heir. A hospital wonderfully equipped, with all known facilities for the care of the sick, for careful investigation, and for teaching work, has fallen to the lot of few professors. And when we add to this an adequate staff of paid assistants, and a generous recognition as regards himself that the laborer is worthy of his hire, we seem to have arrived at an academic millenium. The refreshing part of the whole business is that the conditions are untrammelled, and that, while clinical facilities are abundant, there is ample equipment for investigation and research.

There are two special features of this material inheritance which are deserving of fuller remark. The one the establishment of clinical teaching on a full-time or university basis, and the other the fusion into one department of obstetrics and gynecology—the so-called *Frauenklinik*. In America both these conditions are modern; and with them both there can be no serious contention or disagreement.

(1) By the adoption of the full-time system we secure in the widest and best sense, professional teaching. The teacher will teach not only in the class-room and at the bedside, but in the laboratory and museum; his whole day and his entire energies will be devoted to this work. No longer will he be driven and distraught by the captious demand of private practice; no longer compelled, in the words of John Hunter, to go and earn the damned guinea. It is true he may engage to some extent in practice, and this, I take it, is a great salvation. For in this way he will not become entirely divorced from the work-a-day side of things. Humanity inside a hospital is one thing, and is comparatively easily managed; outside a hospital it is entirely another. I believe that a necessary preliminary in the training of any medical professor should include always some years in the actual practice of medicine. By reason of this actual dealing with men—and very especially with women—he comes to know them on their human side—a knowledge which will forever savor his teaching. A knowledge of human nature is an absolute essential to the successful practice of our profession, and it is the practice of medicine that we are always endeavoring to teach.

(2) In respect of the *Frauenklinik* there can be, I think, but one opinion, for it makes for unity and coördination. Obstetrics and gynecology are not only sister-subjects, but they are twin-sisters; for together they express the sum-total of a woman's sexual life. The one—Obstetrics—represents the discharge of normal function, while the other, Gynecology—embraces the vicissitudes to which, unfortunately, this normal function is liable. Accordingly, the combined clinic treats of this genital system both in health and disease, and a knowledge of the two is interdependent. A modern obstetrician must be a gynecologist, whereas a knowledge of obstetrics makes for good and conservative pelvic surgery. The argument that one man cannot practice both obstetrics and gynecology, because there are only twenty-four hours in the day, no longer obtains in this full-time system. Placed on this university basis, the professor of obstetrics and gynecology may in his service practice both, and find ample time for teaching and research. And his

teaching in these two subjects, in my opinion, gains enormously, for not only is it economical of time but in an admirable and natural way it correlates the work. Moreover, there is, the gods be thanked, one teacher and one subject less in the medical curriculum.

This, then, is the teacher's inheritance—our own inheritance. Of its two aspects, the spiritual and the material, there can be no question which is the more important; for the spirit alone can quicken and vivify.

The realization of this inheritance is certainly not of to-morrow, for educational Rome was not built in a day. The Magee Hospital is a corner-stone in this great city, and we congratulate Professor Ziegler and his colleagues upon their noble inheritance.

As medical teachers we remember that we serve not only the present but also the far-reaching line of the coming generations; for we are told that the country whose inhabitants shall not say "I am sick" is exceeding far off.

THE ELIZABETH STEEL MAGEE HOSPITAL AND ITS WORK.*

BY

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THE words which have just been spoken of Christopher Lyman Magee constitute an appropriate and loving tribute to a great and good man. Mr. Magee was a man of rare spiritual and mental endowments and of a charming personality. He was a loyal friend, a good citizen and a generous benefactor. But the best thing that will ever be said of him is that he loved and appreciated his mother and in her name gave all he possessed for the cause of humanity. As a result the Elizabeth Steel Magee Hospital will ever be regarded as a monument to Mr. Magee as well as a memorial to his mother. Because of the nature of the work which the hospital will do, however, it becomes more than this. It is essentially a hospital for women and as such is dedicated to the tender administrations of childbirth and maternity and to the treatment of diseases peculiar to women. In no other way could the double purpose which Mr. Magee had in mind have been so effectively accomplished. The son loved the mother because of what the mother, in fulfilling the

* Presented at the dedication of the Elizabeth Steel Magee Hospital, Pittsburgh, October 27, 1916.

sacred obligations of maternity, had done for the son. What more fitting then than that the son should dedicate to the memory of the mother a work which lessens the sufferings and risks of childbirth and adds to the joys and efficiency of motherhood.

Although the nature of the hospital to be erected was not definitely specified by Mr. Magee in his will, the presumption was that it would be a general hospital. A careful study, however, of the local hospital conditions at the time the provisions of the will became operative, revealed the fact that fully 30 per cent. of the beds in the general hospitals of the city were unoccupied. It was thus perfectly plain that for some time to come at least, there would be no need for additional general hospital accommodations. It so happened that a clause in the will directed that there be admitted to the hospital, "all women applying for admission thereto for lying-in purposes." So much of the will was thus perfectly plain—namely that the hospital was to be, in part at least, a maternity hospital. On the basis of this fact and realizing the great need of hospital accommodations for lying-in purposes in this community, the trustees decided to build a hospital exclusively for women. This decision was reached, however, only after most mature deliberation. Letters were sent to a number of the leading obstetricians in the country holding the chairs of obstetrics in certain medical schools. Replies were received from all of them and were unanimous in recommending: (1) That the hospital should care for both maternity cases and cases of diseases of women; (2) that there should be but a single head in the person of a medical director, and (3) that the proposed hospital should be made a teaching institution operating in affiliation with the School of Medicine of the University of Pittsburgh. It was pointed out that obstetrics and diseases of women naturally and logically belong together and that their separation into two specialties is detrimental to both and most especially to obstetrics; and that since obstetrics is a branch of surgery, the obstetrician cannot teach and practice it successfully unless he is trained also in the surgery of all the conditions peculiar to women. It was further pointed out that in Germany where obstetrics and gynecology have reached their greatest development, the combination exists in the famous "Frauenkliniks" or hospitals for women, all of which are university teaching institutions in charge of university professors as their medical directors. A committee of the trustees later visited a number of the gentlemen from whom letters had been received with the result that the decision was soon reached to establish the proposed hospital along the lines of the recommendations received.

Five years have passed since the permanent organization of the hospital was effected and the architect selected. Work on the plans was begun on Jan. 1, 1911; ground was broken on Jan. 12, 1914, and the completed buildings were turned over by the contractors to the trustees but a few days ago. I shall not speak of the construction and equipment of the new buildings as the general public will be given an opportunity to inspect them this afternoon. Suffice it to say that they are admirably suited for the purposes to which they will be put. There will be accommodations for 140 adult patients and eighty-five babies. The cost including the furnishings and equipment and the residence of the medical director, will be about \$700,000.00.

During the preparation of the plans and the erection of the new buildings, the work of the hospital has been carried on in the old Magee homestead which was altered and equipped for the purpose and opened for the reception of patients on Jan. 19, 1911. During the period of four years and nine months over 2000 women have been admitted for treatment and 1800 babies have been born. The work has grown far beyond our ability to care for it. During the past two years we have been compelled to turn away patients almost daily because of our limited accommodations. It is confidently expected that the new buildings with their greatly increased capacity will likewise soon be filled.

Of interest also since closely affiliated with the Magee Hospital is the Pittsburgh Maternity Dispensary which cares for confinement cases in the homes only. The four physicians, five nurses and social worker constituting its staff, are caring for about 100 confinement cases a month and making over 1000 visits a month in the homes of the poor of Pittsburgh.

The need for such institutions as the Magee Hospital, not only in Pittsburgh but elsewhere throughout the country, may best be appreciated by reference to the present day status of obstetrics. It is generally conceded that the standards in obstetric practice are the lowest of all the clinical branches of medicine. In emphasis of this fact it need only be recalled that approximately 50 per cent. of all the confinements occurring in this country annually are in the hands of midwives. Of the 15,000 confinements occurring in Greater Pittsburgh last year, over 5000 were cared for by midwives. In no other branch of medicine and of surgery in particular, are uneducated, nonmedical individuals permitted to practice. It is stated upon competent authority that about 8000 women die annually in the United States from childbed fever—a preventable disease—and

that fully as many more perish from other accidents and complications of childbirth. In addition to those who lose their lives untold thousands are crippled, incapacitated and invalided as the direct result of ignorance and neglect. It is variously estimated that from 50 to 75 per cent. of women seeking relief from affections peculiar to their sex, do so because of ignorance or neglect during and following the births of their children. And yet every specialist in obstetrics knows from results in his own practice that all but a very small percentage of this mortality and morbidity is inexcusable and preventable by the proper management of obstetric cases. Be it understood, however, that the blame rests not alone with the midwives. Much may justly be laid at the doors of incompetent physicians who do little, if any better work, than the midwives.

The only excuse that there can be for midwives and incompetent physicians in the practice of obstetrics is the matter of compensation. Because they are unable to pay for anything better, the work among the poor has very largely been left to midwives and incompetent or inexperienced physicians. Even with people in more comfortable circumstances the choice of an obstetric attendant is all too frequently determined by the size of his fee. Many such women there are, who know the meaning of good obstetric care and would gladly employ the trained obstetrician, but he costs more than they can pay and so they content themselves with less competent practitioners. We hear much of race suicide and that women no longer are willing to have children. Be this as it may, there can be not the slightest question but that thousands of women best fitted to bear children and to assume the responsibilities of motherhood, would gladly have children and more of them were they able to carry the financial burden which would be thereby imposed.

The problem then is how to secure efficient training in obstetrics for students of medicine and how to provide for women of every social and financial standing, competent obstetric care for what they are able to pay. I believe that the problem of good obstetrics will ultimately be answered very largely through education of the public. It will remain for the medical profession to demonstrate the needs and possibilities of good work, largely through results in practice, and to point the way for the training of competent obstetric practitioners, but the people themselves must be brought to the point where they will demand good service and be ready and willing to provide the means. We have poor obstetrics in practice very largely because the teaching is poor in this important branch of medicine. And the teaching is poor very largely because the people

do not give the moral and financial support to teaching hospitals that they should. This is especially true of maternity teaching hospitals and dispensaries. It is the rule for the lay public to object to undergraduate students in medicine attending confinement cases, "experimenting" as they so fondly call it. These same objectors usually think very well of physicians as a class and the better they are trained the more highly they think of them when it comes to members of their own families; but the student in training, they have only contempt for him. They forget that it is the same individual who is the student to-day that is the practitioner to-morrow, licensed to handle anything in obstetrics that comes along and that whether he kills or cures the same law protects him which has licensed him to do just what he has done.

The whole thing is a mistake and the public should be made to understand this. It should be regarded as the duty of every citizen, if for no other reason than that of the safety of his own family, to insist that students of medicine be not only supplied with ample obstetric material, but that they be required also to use it in gaining knowledge which is indispensable to safety and efficiency in practice. The average practitioner who gains his experience alone and on his own responsibility after he enters private practice, rarely if ever, becomes a skilled obstetrician; and should he ever become so, the chances are very great that he has gained his knowledge at the cost of much invalidism and of a number of deaths. If physicians must acquire experience in obstetrics, let them, before they are licensed to practice, do so under competent supervision and instruction where they will at least do no harm.

The cry that is raised against using hospitals for teaching purposes is an empty one. The fact is that every hospital that is worthy of public support and patronage is inevitably a teaching hospital. Recent graduates in medicine and nurses in training enter hospitals with no other purpose in view than to learn, and just so soon as hospitals deny them this opportunity they leave and the modern hospital cannot get along without them. Patients instead of being harmed are immeasurably helped by systematic teaching since their ills are thereby the more certainly and carefully studied; and since those who have charge of them are usually among the best advised physicians in the community, they receive the very best care that is to be had.

It is the purpose of those responsible for the policies of the Elizabeth Steel Magee Hospital, to make it a thoroughly efficient, scientific and helpful institution. Its first and last thought will be for

the best interests of its patients and whether rich or poor its aim will be to give them the best that modern medicine affords and for what they are able to pay. As a teaching institution it will send the gospel of good obstetrics far and wide and through the physicians and nurses trained within its walls, will be the means of providing competent obstetric care for thousands of women who will never see the hospital and who will be reached in no other way. As a research institution it will add to our knowledge of obstetrics and gynecology and thus be of enduring service to humanity.

In contemplation of the generosity, the sympathy, the goodness of heart and the wisdom displayed by Mr. Magee in his magnificent gift to his fellow beings, we have a true and imperishable image of the man. Well may we join in saying of him as was said of "The greatest Roman of them All:" "His life was gentle and the elements so mixed in him, that nature might stand up and say to all the world, 'this was a man.'"

RARER FORMS OF TOXEMIA OF PREGNANCY.

(Report on cases of Chorea Gravidarum and Polyneuritis Gravidarum.)

BY

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New York City.

THE term toxemia of pregnancy has come to be taken as almost synonymous with those syndromes of hepatic and renal disturbances associated with hyperemesis, acute yellow atrophy of the liver and eclampsia, the commoner complications of the pregnant state. There are several varieties of intoxications of pregnancy which, though by no means less serious, are not so well recognized by the general practitioner in this country. Not only is this due to the rarer occurrence of these conditions, but also to the fact that they are apt to be regarded as coincidental complications of the gravid state rather than a poisoning of the system brought on by pregnancy. Text-books on obstetrics make mention of such conditions as chorea, multiple neuritis, salivation, and various skin lesions as probably due to toxemia. Keator reports the case of a primigravida who was in the third month of pregnancy when she commenced to vomit and developed purpuric hemorrhages and hemophilia. The symptoms became severe so that pregnancy had to be

interrupted and, after resort to transfusion, the woman recovered. The writer has known two primigravidæ who complained several times of hematemesis without other symptoms.

There is practically a unanimity of opinion at present that the two more important of the rare complications of pregnancy—chorea and polyneuritis gravidarum—are intoxications brought on by a disorder of the metabolism incident to the gravid state.

Chorea Gravidarum.—It is likely that some of the milder cases of chorea occurring during pregnancy are not reported, being considered as cases of simple chorea. This is more true of those giving a history of childhood chorea, especially when occurring in a young primigravida. Of those giving such history, however, it will be found that some had their attack at or near the onset of menstruation, as has been the case with the patient reported below, in whom the previous chorea might also have been due to a toxemia following a perversion of the function of menstruation. It is important therefore to distinguish between ordinary chorea associated commonly with tonsillitis, endocarditis or arthritis, and chorea gravidarum, which rarely shows any heart lesions even when it terminates fatally.

There are few anatomic changes found in chorea of pregnancy. Some pathologists have found old and recent valvular vegetations, congestion at the base of the lungs, and exudation of bloody serum over the surface of the brain.

The symptoms do not seem to differ from those found in Sydenham's chorea except in degree of severity. There are usually no premonitory signs, the first thing noticed is restlessness and soon, twitchings of the fingers of one hand, usually the left. The movements spread to the upper part of the arm and the whole extremity undergoes the typical rotary choreic motions. The other extremities are soon involved and there is great restlessness, even the trunk being affected. There is difficulty in the taking of food and the patient has to be fed. As the case progresses there is insomnia, irritability, pallor, and exhaustion. There is seldom fever, but, when present, it is said to denote that the prognosis is bad. Various psychoses may complicate the situation, the more common being maniacal outbreaks. There are recurrences in about 15 per cent. of subsequent pregnancies.

Several English observers, like Croft, Wall, Andrews and Shaw seem to be the most optimistic as regards prognosis and most conservative in treatment. Croft reported ten cases from the Hospital for Women and Children of Leeds during a few years.

They all recovered; two being treated by abortion and eight were allowed to proceed in pregnancy. Wall and Andrews reported twenty-eight cases in eleven years at the London Hospital; all were treated conservatively, and two died. Shaw cited eleven cases in four years of which only two, those in whom pregnancy was interrupted, died; the others were allowed to go to term. From the above figures chorea seems to be more common in England than in Germany, for Engelhard found only two cases among 19,910 confinements at the Utrecht Frauenklinik in ten years, while Hannes saw only one in twenty-five years.

The majority of cases occur in primiparæ, but it may come on in multiparæ for the first time, and it may recur in subsequent pregnancies, and sometimes in a more severe form than before. The time of onset is more often the period between the second and fifth month, but it has come on soon after the disappearance of menstruation, and as late as the puerperium. Birnbaum quoted the statistics of Buist, in which

108	occurred during the first three months,
30	occurred during the second three months,
25	occurred between the seventh and ninth month and
11	occurred during the puerperium.

From the same series, 59.3 per cent. occurred in primiparæ and 22.4 per cent. in secundiparæ. Nearly 70 per cent. were between the ages of eighteen and twenty-four.

As regards prognosis and treatment, the cases found in the literature of the last five years do not offer sufficient data for guidance. Of twenty-two cases reported during this interval by various writers, excluding those already quoted, the results were as follows:

	Died	Recovered
Pregnancy artificially interrupted: 11.....	8	3
Pregnancy not interrupted: 11.....	5	6

Of those treated conservatively, one was cured by an injection of salvarsan, one, showing a positive Wassermann, recovered, and one was cured by the injection of 20 c.c. of serum from a pregnant woman. Apparently these were mild cases while those in which pregnancy was interrupted were severe, or abortion was resorted to late. In only one case (Lepage) was abortion produced as early as seventeen days from the onset of symptoms, without avail. In 1898 Shrock published a series of cases showing:

Of 95 which went to term..... 8 died in labor
 Of 19 ending in spontaneous premature labor..... 9 died postpartum
 Of 11 ending in spontaneous abortion..... 2 died postabortum
 and 11 died undelivered..... 11

Of 136 cases treated conservatively, 22 per cent. or..... 30 died.

In 9 cases premature labor was brought on..... 3 died
 In 9 cases abortion was brought on, of which..... 1 died

Of 18 cases treated radically, 22 per cent. or..... 4 died

but of those where abortion was brought on, in other words where pregnancy was terminated early, only one-ninth died. Some German authorities advise early evacuation of the uterus as soon as the diagnosis is made. Lepage, in reporting one case, collected thirty-three fatal cases and compares the method of treatment followed. Of this number, twenty were treated conservatively, and thirteen were subjected to the emptying of the uterus. His cases were collected from the literature covering the period between 1839 and 1909.

CASE I.—A. N., para-i, aged twenty-two, Bohemian, seen April 23, 1915. Patient has had no illness except an attack of sore throat at the age of twenty and a mild attack of chorea at the age of twelve simultaneous with the onset of menstruation. This attack lasted ten days and has never recurred until the present.

On January 20, 1915, she missed her menses and continued in good health until March 24, when she began to experience twitches in the left hand, soon spreading up to the arm and becoming more forcible and rotary in character. Within a few days the whole left side of the body became affected, and at the end of two weeks the whole body was involved. The contractions were becoming constantly stronger and more frequent, and were excited by the least disturbance; the taking of food was becoming difficult, the patient had to be fed, and sleep was irregular and disturbed. In three instances she had mild attacks of unconsciousness, lasting a few minutes; there was little headache, and no vomiting; the bowels moved daily, and there was no difficulty with urination. During the fourth week the speech became scanning, and there was increasing pallor.

Physical examination revealed a rotary motion of the eyes, vision was not impaired, and the reactions were normal. The throat, heart and lungs were normal; there was a slight enlargement in the region of the thyroid; the fundus uteri extended to 2 inches below the umbilicus. The superficial and deep reflexes were somewhat exaggerated, there was no Babinski's sign and no ankle clonus, but the mentality was sluggish. The blood examination was negative, except

for anemia; the hemoglobin being 65 per cent. The temperature was 99.5, the blood pressure 125 millimeters mercury or hg.

The treatment consisted of complete rest in bed, milk, buttermilk, cream, broths, eggs, and plenty of water; the administration of arsenic, bromides, chloral, iron and, at night, a dose of opium. There was no improvement, the appetite diminished, and there was almost complete absence of sleep. The choreic movements were becoming stronger, the pallor more pronounced, and the mental condition duller. She also was harder to manage, as she grew more excitable. It was then decided to terminate the pregnancy. On April 27, at 9 A. M., under mild ether narcosis, the lower segment and cervix uteri were packed with sterile gauze impregnated with a solution of bichloride of mercury, 1 : 1000, and this was supported with a vaginal pack. At the end of twenty-four hours the gauze was taken out and the products of conception removed.

There was marked improvement after packing of the uterus, and again, after the uterus was empty. Improvement from now was quite rapid, the twitchings having disappeared at the end of three days, when the patient could sleep throughout the night. She was discharged eight days postabortum, well and out of bed, and there has been no recurrence up to this date (December 15, 1915).

POLYNEURITIS GRAVIDARUM.

This affection, though not as common as chorea of pregnancy, is probably not as rare as the scarcity of cases in the literature would indicate, some of the cases being attributed to intoxications with exogenous poisons.

The actual nature of the poison is as obscure as that of the more common toxemias of pregnancy. Some cases have been preceded by hyperemesis, while few have been accompanied by thyroid insufficiency. From a study of the few cases found in the literature covering the last five years, it appears that the condition is as common in multiparæ as it is in primiparæ. The symptoms commence more often during the third, fourth or fifth month and are characterized by an acute multiple neuritis affecting all the extremities, some more than others. In some, at least, the toes and fingers suffer less than the rest of the limbs; there are often sensory disturbances like tingling and burning sensations, and some impairment of sensibility. There is seldom involvement of the sphincter control, though this has been reported, and there is loss of reflexes. If the case progresses, atrophy of the affected muscles sets in and the patient becomes bedridden. If the paralysis sets in late in pregnancy, recovery may be looked for, since the causal factor is removed before there is time for the development of atrophy. Thus, Farani reports a case in which polyneuritis preceded by diarrhea, and edema of the legs set in near the end of the eighth month of gestation; the patient went to term, had a spontaneous labor, and made a complete recovery. When the onset is early in pregnancy, however, the paralysis may persist for life, if the intoxication continues. In such case the

advisability of inducing abortion is to be carefully considered, and the employment of the electric current, for the purpose of ascertaining the condition of the muscles, will be very important. Seige reports the case of a primigravida aged twenty-three, who was affected with polyneuritis in the third month, after persistent vomiting which lasted ten weeks; the vomiting ceased in the fourth month and the patient made a slow, but full recovery. The neuritis in this case was attributed to the marked cachexia which followed the vomiting. Of thirty-four cases collected by Hoesslin sixteen gave histories of marked vomiting. Spire reported one case and collected five others which had no vomiting. In Spire's case, the onset was in the sixth month, with cramps followed by polyneuritis, incontinence of urine and feces, pigmentation of the skin of the face, and rapid pulse. Premature labor was induced in the seventh month and the woman recovered very slowly, although the paralysis and pregnancy had only coexisted about six weeks.

CASE II.*—R. C., para-iii, aged twenty-four, born in U. S.; previous illness: measles. Menses started at thirteen and were always normal. No exposure to alcohol or lead; both children are healthy.

The patient came under observation when seven months pregnant. She was then bedridden, all the extremities were paralyzed and more or less atrophied, especially the lower extremities, and right upper; there was very little power in the toes and fingers, none in the right leg and arm. She gave the following history: In November, 1914, when in the third month of gestation, she was seized with headache, dizziness, vomiting, and loss of power in the right arm and left foot. The next day, she lost her power of speech and power of left hand and right leg. There was no sensory aphasia and no loss of consciousness, no disturbances of sensation, of the special senses or of sphincter control. After three days the speech came rapidly back and she experienced slight cramps in the legs and numbness and tingling in the arms and legs. The left hand gradually improved and, under treatment with the electric current, there was some improvement in the other extremities. There was at no time facial paralysis. There were no convulsions.

Examination of the blood for the Wassermann reaction proved negative and, as the process seemed to be arrested at the time she was first seen, there was no indication for interference with pregnancy. The electric treatment was continued and she was allowed to go to term, when she was delivered by the aid of "low forceps" of a normal baby. At this time there was fairly good motion in the left hand but the other limbs were of slight use.

Outcome: December 15, 1915, very little additional improvement, patient is still unable to make much use of legs and right arm.

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 1427 MADISON AVENUE.

THE TREATMENT OF TRAGIC FORMS OF RUPTURE IN ECTOPIC PREGNANCY BY VAGINAL SECTION AND THE APPLICATION OF A CLAMP.

BY

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THE predominant condition present when a tubal pregnancy ruptures or a tubal abortion occurs is that of intraabdominal hemorrhage. This hemorrhage tends to continue until the patient is shocked or exsanguinated, and at times is fatal.

The reports of coroner's physicians and the experience of many surgeons show that in certain cases the hemorrhage is not self-limiting, but tends to continue or recur until the patient dies. Despite the experimental studies in animals indicating that death does not follow from hemorrhage when the ovarian arteries are

divided or the abundant clinical evidence that under rest and narcotics spontaneous arrest of the bleeding occurs in many cases of extrauterine pregnancy, the fact remains that there are certain so-called tragic cases in which the patient usually dies, unless the hemorrhage is controlled by operative intervention.

Unfortunately, no method of examination has yet been devised that will enable one to accurately prognosticate those cases in which the bleeding will cease spontaneously and those in which it will progress to a fatal issue. Early operation especially is suggested for those patients whose alarming and progressive symptoms lead one to fear a tragic form of rupture. It is important, however, that the measures taken to arrest the bleeding do not in themselves destroy the patient. A patient with a ruptured ectopic pregnancy suffers from a shock produced first by the loss of blood, and second, from the shock produced reflexly by the peculiar irritant action of the blood upon the peritoneum. The irritating action of the blood upon the peritoneal surfaces is evidenced by tenderness, pain, nausea or vomiting, and rapid fall of blood pressure, which immediately follows the contact of blood with the peritoneum. This shock from the mere contact of blood with the peritoneal surface is a normal protective reflex, designed to so lower the blood pressure as to diminish the bleeding. It is a very important but ignored factor in increasing the danger of tubal rupture.

In patients dying from a ruptured ectopic pregnancy, much less blood may be found in the abdominal cavity, than is lost without very alarming general symptoms, during a miscarriage or labor. The shock, therefore, produced by the contact of blood with the peritoneum is one of the great sources of danger from intraabdominal hemorrhage. When to this is added the further irritation and shock produced by the exposure of the peritoneum to air, irrigation, sponging and handling, the balance may be turned against the patient.

In the treatment of ruptured tubal pregnancy by an abdominal section, therefore, the patient suffers with shock from loss of blood, plus that from the peritoneal reflex, and, finally, has added the shock of the operation with the inevitable exposure of the peritoneum to the air, and to the handling, mopping, and possibly washing of peritoneal surfaces in the endeavor to free the abdominal cavity of liquid and clotted blood.

I think that there is no doubt that in many cases this superadded shock of an abdominal section is the important factor in determining the patient's death. It is true that many patients die without any

operation, but it seems likewise to be true that many patients die more rapidly and more surely because the operation is done, while it is now recognized that a large proportion recover under a simple expectant treatment.

The ideal treatment for ectopic pregnancy should be the immediate control of the bleeding area without increasing the shock by exposing the general peritoneal cavity. Fortunately, this may be accomplished by a method so simple as to be capable of an application without trained assistance, with but few instruments and without special preparation, and even in the patient's own home. During the past ten years all the patients who have come under our care with alarming symptoms from ruptured extrauterine pregnancy have been treated in this manner, and there has been no mortality from the operation. In a total of twenty-four cases, in one instance the patient died about two weeks after the operation from pneumonia. In no instance was a secondary operation necessary, and the final conditions of the other patients has been gratifying.

The contrast between the results obtained by this method and those I have obtained from abdominal section is such, that I am convinced that this is the safest method yet proposed for the treatment of at least the tragic forms of rupture. The method is as follows:

Anesthesia.—For most of our patients spinal anesthesia has been employed, novocaine or stovaine being the drugs used. While our results have been satisfactory, in cases of severe shock, spinal anesthesia as it is usually employed is dangerous, and, as a rule, a light ether anesthesia should be preferred.

Operation.—The patient is placed in the lithotomy position, the usual vaginal preparation made, a posterior weighted vaginal speculum introduced, the cervix grasped by a tenaculum forceps and pulled downward and forward, the posterior vaginal fold behind the cervix located, and the culdesac opened in the median line by thrusting a pair of sharp-pointed scissors through this line toward the posterior uterine wall. The scissors is opened and withdrawn, and the index-finger of each hand introduced through the incision, and by traction the incision into the posterior culdesac is widely enlarged. The escaping blood is disregarded, two fingers are immediately introduced into the culdesac and swept to each side of the uterus locating the tubal enlargement. The diseased tube is freed by sweeping the fingers about it, and when thoroughly isolated it is pulled down through the vaginal incision. This

maneuver may be accomplished by the sense of touch alone. In some instances, to expedite the separation of a very high appendage, we have introduced a hand into the vagina, in others a ring or small sponge forceps has been guided by the finger and used to grasp and pull down the tube. The anterior vaginal wall being lifted by a trowel, the affected tube with the ovary is pulled well down into the vagina and a clamp applied close to the uterus. It is obvious that the clamp must be applied proximal to the point of bleeding. In one of our cases the pregnancy involved the cornu of the uterus, and after excising the tube, the area was closed by sutures. If the patient's condition permits, ligatures may be applied to the broad ligament proximal to the affected portion of the tube and to the ovary. As a rule, this has little advantage over the simple application of the clamp. The tube and ovary distal to the clamp may now be cut away but care must be taken to leave a sufficiently large pedicle and to see that the friable tissues do not slip from the grasp of the clamp. Where the patient is *in extremis* nothing but the application of a clamp need be done at this time. A piece of gauze sufficiently wide to fully occupy the vaginal incision is introduced into the pelvis high enough to isolate the clamp from the intestinal coils and to prevent the edges of the vaginal incision from coming together. A second strip of gauze is introduced between the vaginal wall and the clamp. As a rule, no large vessels are divided, and the vaginal incision does not require ligature or suture. Irrigation of the abdominal cavity should not be employed nor should any special effort be made or time wasted in the endeavor to remove blood or clots from the cavity. The blood will gradually drain away after the patient has returned to bed.

The vaginal incision, application of the clamp and insertion of the gauze drainage strips may all be accomplished in from three to ten minutes, and the patient is returned to bed with the hemorrhage controlled, and with little increase in the preëxisting shock. Usually we have not been able to determine that the patient's condition has been made any worse by the operation. Although some of our patients were nullipara and the small diameter of the vagina interfered with the liberation and exposure of the tube, in no instance was it necessary to abandon the vaginal route. In such cases, however, those not familiar with the technic of vaginal section may find the method difficult.

In the after-treatment, one should avoid excessive hydremia by the overuse of hypodermoclysis or saline transfusion. Excessive stimulation and other disturbing factors should likewise be avoided.

As soon as the patient's condition will permit, the head and shoulders are moderately elevated to favor drainage. Liquids are administered by the bowel soon after the operation, and by mouth as soon as the retentive power of the stomach returns.

At the end of forty-eight hours the clamp is cautiously opened $\frac{1}{2}$ inch, rotated ninety degrees in each direction and removed. There is no special advantage, and probably some increased danger in using a ligature instead of the clamp. The gauze is removed on the fourth or fifth day, and usually does not require replacement. The abdominal blood gradually drains through the vagina, or may, in part, be absorbed. It is very important to aid elimination by the daily use of saline laxatives as soon as the patient's condition warrants it.

The patient may sit up in bed at the end of a week or ten days, and in favorable cases go home in a few days later. The shortest stay in the hospital was eight days; the longest forty days. The mean duration of hospital treatment was about twelve days. The gauze is usually removed about the fourth or fifth day, and as a rule, is not replaced. In one instance an assistant removed the gauze about twenty-four hours after operation, and there was prolapse of the intestinal coils into the vagina. In this case only was a second packing introduced.

To summarize, the method suggested enables one to immediately confirm the diagnosis and check the hemorrhage of tubal pregnancy by a simple, rapidly executed operation, with little invasion of the abdominal cavity, with little or no increase of preëxisting shock, and with an armamentarium so simple that the operation may be performed on the bed of a country farmhouse.

2033 WALNUT ST.

CESAREAN SECTION FOR STRANGULATED OVARIAN CYST COMPLICATING LABOR.

BY

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MRS. A. W., aged twenty-two, entered the San Francisco Hospital, Jan. 17, 1916. Her family history was negative. She was a well-developed and well-nourished woman near the end of her first pregnancy. Her last menstrual period was May 3, and her calculated time of labor, February 10.

She stated that her gestation was normal and that she had been perfectly well until ten days ago when, after two days of uneasiness, she was taken with a sharp pain in the right lower quadrant. There had never been any prior attacks. This pain was steady, severe and accompanied by tenderness. There was no fever, constipation or tympanites. The movements of the child hurt her very much and she could not lie on the right side. This attack lasted for several days and then disappeared rather suddenly. After two days of freedom from suffering it returned on the 16th with increased severity and she entered the hospital the next day after a sleepless night.

Upon her entrance the pulse and temperature were normal, but soon began to rise steadily. I examined her soon after her admission. She was pregnant as stated, no cervical dilation, vagina normal, all venereal history denied. The head was presenting and lifting this up relieved the pain. The left side was free from all tenderness but the right was very sensitive. Pressure of the head to the right gave her much suffering. There was a marked tenderness over McBurnay's point and any pressure on the abdomen that pushed the uterus to the right, intensified the pain. A bimanual examination elicited an ill-defined sense of there being some mass in the pelvis above the head, but she was too tender to permit its real palpation. The abdomen was relaxed. She complained of a constant severe pain, intensified by every movement of the child.

I decided to apply hot compresses, put on a snug abdominal binder and watch her for a few hours. This gave but little relief and on the 19th I had a consultation. She had had two sleepless nights and all her symptoms were aggravated. The chart showed a steady rise of pulse and temperature. My consultant inclined to the diagnosis of appendicitis and to this I, with reservation, concurred. To me it seemed strange that if it were appendicitis it had not been set up earlier in her gestation or given some previous trouble. Her blood pressure was normal and no leukocytosis was present. We agreed that in the light of two days of pain with an increasing pulse and temperature there must be a pathologic condition of sufficient severity to amply justify surgical interference and because of her near labor this would have to be preceded by a Cesarean section.

The same evening a Cesarean section was done and a 7-pound male infant extracted. It was noticed on opening the abdomen that there was an extra amount of fluid present and some congestion of the peritoneum.

On turning the uterus over an ovarian cyst with a pedicle several inches in length was found, dark brown and almost gangrenous. It was strangulated by three distinct turns to the right. Its pedicle was transfixed, ligated and the cyst removed. The appendix was some 5 inches long, very thick and congested and was removed. The peritoneum contiguous to the cyst was generally congested. The left tube and ovary, the latter bearing a corpus luteum, were normal and were left. She was not sterilized.

Her recovery was uneventful except for an unusual degree of distention from gas. She nursed her baby, temperature never ran

over the usual surgical fever; she was in a chair the tenth day; stitches were removed the eleventh day. She was discharged February 2, having been walking about the ward for several days.

She called to see me at my office with the baby on February 21, saying she was never in better health, but worried because the baby was vomiting after each nursing. It was merely getting more milk than it could hold.

240 STOCKTON ST.

FRIED WOUND DRESSINGS.

BY

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New York City.

THIS brief article is inspired by the following facts:

1. THE AMERICAN JOURNAL OF OBSTETRICS published a paper entitled "Wound Dressings," February, 1916.

2. Inquiries abounded. The nearest source was a man from the next street: the farthest, The Baptist Mission Hospital in Hanyang, via Hankow, China. *The Medical Press* of Dublin published the paper in full, with credits, March 29, page 286.

3. If this present writing does not answer all questions fully and thereby cause the inquiries to cease, then the writer will be compelled to have form letters printed embodying the answers, and he will mail those to the questioners.

4. The Censor has delayed and opened the letters from British sources, therefore, the author must be under suspicion of some sort which THE AMERICAN JOURNAL OF OBSTETRICS really owes it to him to remove; at least it might attempt to remove that suspicion by publishing an inconsequential but necessary explanation, such as this is meant to be.

In frying bandages at the Knickerbocker O. P. D., the nurse uses an ordinary gas flame from a two-burner gas stove; upon the top of such a stove she places a toaster to prevent burning the lard. Then in a deep but narrow stewpan or an agate pail she places a saucer bottom up to prevent the bandages coming in contact with the metal bottom. Upon the saucer she places four pounds of lard, turns on the gas, lights the flame and melts the lard. Using a long bullet forceps she picks up a drop or two of water, occasionally, and drops it into the molten lard because when the latter "spits" the temperature is correct (300° or over). Then she takes wipes which have been done up in packages of four and tied with thread. These she puts into the boiling lard, which, after the habit

of boiling lard, is still and does not bubble. On contact, the air is driven out of the bandages and the whole boils furiously, especially at the edges of the wipes (points of contact). As soon as the boiling becomes less vigorous another package is added and then another until the pail or receptacle is filled to within two inches of the top. Inasmuch as the wipes float they must be submerged by pushing them under with the long forceps. When the can is sufficiently full a saucer should be placed on top of the wipes and a piece of gauze put in as an indicator. When the latter has become a light brown, but not charred, merely slightly scorched, then the flame is turned off and the whole allowed to stand and cool to 180° . A sterile towel is spread over an enameled dish or wash basin, the wipes picked up with the bullet forceps and laid therein and the whole covered either with the same towel folded or with an additional one.

The results of placing wipes which are impregnated with lard and which have been subjected to a temperature of 340° , over one hundred degrees above the boiling point of water, may be easily foretold. They are germless and will not adhere to wounds. Anyone who has fried doughnuts can readily fry wipes. The question is often asked: "Will an oil (*e.g.*, olive oil) answer as well as lard?" The present writer can see no reason why it should not, but the lard-fried bandages proved to be so good that he was never tempted to investigate the properties of the oils for this purpose.

The common mistakes made by a green hand are due to the facts here enumerated:

1. Does not know what boiling lard looks like.
2. Does not turn out the flame if the lard begins to burn.
3. Uses too much heat after the lard is raised to boiling.
4. Does not know that water in boiling lard will spatter.

On each and all of which any good cook can give valuable advice.

One questioner wishes to know: "If aristol is put on a wound will the fried dressing work?" *Ans.*: Perfectly well. The dressing will dissolve the aristol, but this is no disadvantage. Aristol is perfectly soluble in melted lard but the heat turns it into iodine and the latter is soon driven off. With care the hot wipes may be powdered with aristol; this turns into iodine and sinks into the fabric leaving the characteristic stain (red brown). There is no advantage in this. The idea is to prepare a nonsticking germless wound dressing or drain. Careful frying does this admirably and unfailingly. Success depends on the cook.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of March 14, 1916.

The President, DOUGAL BISSELL, M. D., in the Chair.

DR. EDWARD W. PINKHAM reported a case of

CESAREAN SECTION FOR DYSTOCIA DUE TO DOUBLE UTERUS AND FIBROIDS.

The patient Mrs. M. S., married four years, aged thirty, was first seen on December 12, 1915. She gave a history of a spontaneous miscarriage two years ago at two months. Her last menstruation occurred during the last week of May, 1915, and life was felt the latter part of October. The patient was a well-developed woman with normal pelvic measurements. Bimanual examination showed an enlarged uterus extending about three fingers above the umbilicus and several hard masses on the left of the uterus. There were two vaginal canals and two distinct cervixes. The patient was admitted to the Woman's Hospital on February 14, 1916, in labor. Examination showed the cervix on the right side slightly patulous, while the os on the left side admitted the forefinger. The pains, which were irregular and without much force, continued through the day and until the next morning when they became regular and stronger. Examination on the morning of the 16th showed practically no dilatation of the right cervix, while the left was a little more patulous. During a pain the uterus assumed a distinctly elongated shape and it was almost entirely on the right side. The masses on the left side were apparently causing a dystocia and on consultation with Dr. F. A. Dorman a Cesarean section was decided upon and performed. A live baby weighing 5 pounds 3 ounces was extracted. Examination showed a distinct uterine body on the left side about the size of a large pear joining the pregnant half at the level of the internal os. There were two pedunculated fibroids attached to the same and a normal tube and ovary. The accompanying diagram shows the anatomical arrangement and the x-ray picture the duplex formation of the organs.

DISCUSSION.

DR. EDWIN B. CRAGIN, in opening the discussion said: "There are several interesting features about a uterus didelphys, such as this is, complicating labor. It has been my misfortune to meet

with two of these cases and it is just the didelphys type that causes trouble. In my first experience the unimpregnated half so narrowed the canal that in delivering through the impregnated half a rupture occurred between the two halves and I had to open the abdomen and remove the smaller obstructing half and sew up the rent. In the second one I had the same dystocia as that shown by the reader of the paper and I did as he did, a Cesarean section.



FIG. 1.—Pinkham—Double uterus.

It is well to bear in mind that while a uterus septus or bicornis gives very little dystocia as a rule, a uterus didelphys may from its unimpregnated half, give practically the same dystocia as a fibroid and that often Cesarean section is the best way to solve the problem."

DR. HIRAM N. VINEBERG.—"I am very much interested in this case because of the fact that about three weeks ago it was my lot to deliver a woman with a uterus didelphys, as far as I could make out. She had two distinct vaginae and two cervixes, and when she came to me the first time she was about eight weeks pregnant

and I could make out the larger uterus on the left side and the smaller one on the right side. She went on to full term without any mishap and had a perfectly normal delivery. The right half gave no trouble. The head as it came down tore away the septum. I had absolutely no trouble with it then. The only difference noted from the ordinary case was that on the second or third day the woman had a slight temperature and on compressing the right half (that is, the uterus that was unimpregnated) there was a good deal

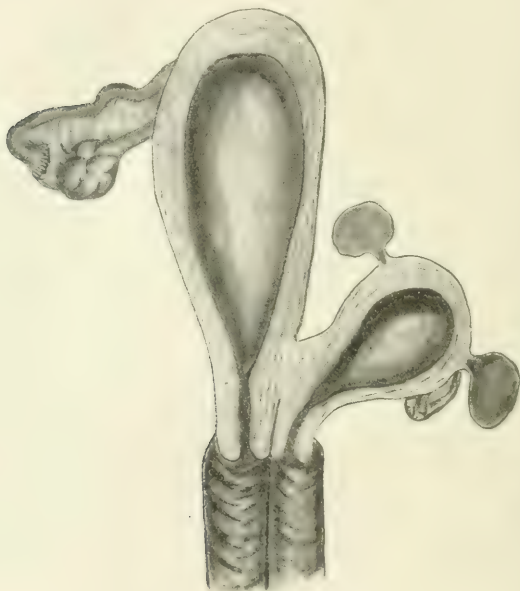


FIG. 2.—Pinkham—Double uterus and fibroids.

of decidual membrane expressed, but in other respects the patient made a perfect recovery."

DR. BROOKS H. WELLS.—"There have been quite a number of cases reported in the literature of pregnancy in one or the other horn of a uterus didelphys. Sixteen years ago I reported four cases before this Society, and at that time I looked up the literature and found over 100 cases reported. Since then I have had several other cases where pregnancy has occurred in a uterus didelphys. In one where there was a very perfectly separated pair of uteri with double vaginæ and originally a double imperforate hymen,

labor went on normally except that the central band in the vagina, which ran all the way up to the cervix, was pushed down in front of the baby's head so that it became necessary to divide the band. One point which has not been brought out in the discussion is the great liability to uterine rupture in these cases."

DR. J. MILTON MABBOTT.—"I recall two unreported cases attended by me. One was a private patient in the old Nursery and Child's Hospital. The other was a patient in private practice. Both were delivered at full term without any unfavorable incident. The septum of the vagina was allowed to rupture with the progress of the head without artificial help. The deliveries in the first pregnancies were both normal. The second case (the one in private practice) was so normal after delivery that I assumed that a future delivery would probably be simpler than normal; but the woman assured me that if she became pregnant again she would come back to New York, she then being about to go to California to join her husband. About two years later she came back and had such an easy delivery that, being called early in the morning, I was at the house within an hour and the baby was born upstairs as I was ringing the door bell downstairs. So those are two cases that I can add and the three deliveries were perfectly normal."

DR. EDWARD W. PINKHAM.—"The only thing I would say in answer to Dr. Vineberg is that we gave this patient a good long trial to see if she couldn't dilate the os and have a normal delivery through the normal channel, but there was no attempt at all of the right os to open. Evidently it was being pushed over to the other side by the tumors, and if there had been no dilatation from the time she began to have her regular pains until we had the consultation, it seems to me that the baby couldn't be born in any other way except by pursuing the procedure which I did."

DR. HIRAM N. VINEBERG.—"I would just like to add one thing. In the unimpregnated uterus when labor was fairly well advanced, that is, when the cervix of the left uterus was dilated, the cervix was dilated to the extent of almost one finger and it dilated so that I could insert a finger up to the internal os. I don't know whether any one else has noticed that in these cases."

DR. LEROY BROWN presented a report on

SPINDLE- AND GIANT-CELLED POLYPOID SARCOMA OF THE UTERUS.

Miss E. B., aged seventy, was admitted to the Woman's Hospital with a history of normal menstrual conditions and a menopause at fifty-four. Since September, 1915 the patient had had an irregular bloody vaginal discharge which gradually increased in amount. A general discomfort in the lower abdomen was complained of and although no loss of weight occurred the general physical condition seemed poor. The heart showed a distinct systolic murmur but no hypertrophy. There was a marked trace of albumin present but no casts. The blood count showed 4,160,000 red cells and 70 per cent. hemoglobin, with a normal white cell count. Pelvic examination showed an atrophied senile vagina and a tumor apparently filling the pelvis. During the manipulations of the bimanual

examination an abundant purulent discharge resulted. A complete abdominal hysterectomy was done after the patient had been in the hospital a month, on February 10, 1916, which was followed by an uninterrupted convalescence. The physical condition was greatly improved at the time of the patient's discharge about a month later.

The pathologist's report on the specimen was as follows:

Diagnosis.—Sarcoma uteri polyposum fusi and gigantocellulare.

Macroscopical: Uterus with both adnexa, cervix was received separately. Uterine body is balloon shaped and measures 13 cm. in diameter. Uterine myometrium is about 8 mm. thick. The uterine cavity is greatly enlarged. From the lateral portion of the uterine mucosa arises a polypoid tumor mass of oval shape measuring 10 × 8 cm. The surface is yellowish in the portion adjoining the mucosa. The tip is dark red. On section the lower portion of the conical tip is purple grayish, the portion nearer the mucosa white, fibrous and hard. The cervix which was received separately shows no marked changes. Adnexa are of normal appearance. A subserous myoma of about 3 cm. diameter shows a completely calcified capsule.

Microscopical: Section of the polypoid tumor shows that the largest part of the tumor is composed of spindle cells of different sizes. The enormous variety of the nuclei as regards size and staining properties, numerous giant cells of an irregular type scattered in the tissue and masses of mitoses give the section the appearance of intense optical unrest. Necrotic tissue between these portions. No normal fibers nor muscular tissue in any part of the section.

The pathologist did not regard the specimen as a sarcomatous change of a myomatous tumor but as a sarcoma of the musculature of the uterus which in its development took on a polypoid form.

DR. HIRAM N. VINEBERG reported a case of

STREPTOCOCCEMIA, LEFT OVARIAN STREPTOCOCCIC ABSCESS AND
STREPTOCOCCIC LYMPHANGITIS AND PHLEBITIS OF THE
UTERUS. PANHYSTERECTOMY. RECOVERY.

M. C., aged seventeen years, married twelve months, was admitted to his service at Mt. Sinai Hospital, Feb. 16, 1916. Seven days before, she had had a normal delivery, on the third day, post-partum, she had a severe chill followed by high fever, which persisted to the time of her admission. With the onset of the chill the patient suffered with cramps in the lower part of the abdomen. On the morning of admission, temperature was 104.6°, pulse 120, respiration 32. The young patient was very stout and her general appearance quite good. The uterus reached to the umbilicus and leading from the right cornu, a small oblong, hard mass could be indistinctly palpated. There was considerable tenderness at this point. Nothing abnormal was detected on the left side. At midnight, temperature 98.4°, pulse 90. Feb. 17, A. M. temperature 104.8°, pulse 120.

At 10.00 A. M., the interior of the uterus was gently gone over with a dull curet by my associate Dr. Sol. Wiener and several shreds of tissue were removed. This was followed by an intrauterine irrigation of weak iodine solution. Half an hour later, a blood culture was taken, this showed, within twenty-four hours, numerous colonies of hemolytic streptococci.

At 5.00 P. M., the patient had a very severe chill, lasting an hour and ten minutes, the temperature at 8.00 P. M. reached 106° , pulse 120, respiration 34. A blood count taken at the same time of the blood culture, showed white cells, 14,000; polynuclears, 81 per cent.; lymphocytes, 19 per cent.; hemoglobin 65 per cent. At midnight, temperature had fallen to 101.8° , pulse 112. Feb. 19, A. M. temperature 104.2° , pulse 140, respiration 32. In view of the positive blood culture and the local conditions present, favoring the assumption of a septic thrombophlebitis, it was Dr. Vineberg's opinion that the only chance of saving the patient, lay in a total hysterectomy with ligation of the involved vein or veins. Accordingly, a pan-hysterectomy was performed on Feb. 19, at 10.00 A. M., the tenth day postpartum.

On opening the abdomen, a considerable quantity of tinged serum was found free in the peritoneal cavity. A tongue of omentum was adherent to the right cornu of the uterus. This constituted the mass that was felt on bimanual examination. There were no adhesions or exudates, elsewhere. The left ovary appeared rather large, but not until later, during the manipulations in performing the hysterectomy, was it detected that pus was exuding from its surface and, that there was an escape of pus from the uteroovarian ligament. Fortunately, at the outset of the operation, the intestines were carefully protected by gauze compresses and packings. The operation offered considerable technical difficulties, particularly, in the excising of the uterus, together with the cervix, owing to the great obesity of the patient and to the inadvertence of an interne who failed to catheterize the patient on the table. Nevertheless, the patient withstood the operation particularly well. The skin and fat layers were merely strapped together with adhesive strips and drained with a strand of gauze.

Feb. 20 and 21, first and second day postpartum, temperature ranged from 103° – 105° , pulse 120–144. Patient had a severe bronchitis. Feb. 22, 23, and 24, temperature ranged from 101° – 103° , pulse 116–124. The abdominal wound showed very extensive supuration of the fat layer. On this being freely laid open and wet dressings applied, the temperature fell almost to normal, within a few days and the patient, now is up and about and the wound almost healed. A blood culture taken Feb. 21, two days after operation, was entirely negative.

Report from the Pathological Laboratory.

Specimen consists of uterus and both adnexa. Uterus is about the size of a five days' postpartum uterus. The mucosa and uterine wall show no particular variation from that expected in the uterus of this type. Both tubes are normal. The right ovary if normal

shows numerous microcysts. No evidence of inflammation. The right ovarian vessels are open. The left tube is normal. The left ovary is markedly edematous showing at its hilus an abscess cavity about 1.5 cm. in diameter, which extends into the mesovarium beneath the peritoneum and has perforated through the mesosalpinx. The vessels on this left side contain fresh blood clot. On section, this edematous left ovary is riddled with small purulent foci.

Microscopical examination shows the presence of multiple ovarian abscesses, one large one at the hilus extending into the mesovarium and mesosalpinx. A few of the lymphatics and veins of the uterus contain organisms in chains (streptococci.) The placental site shows extensive necrosis, numerous streptococci, especially on the surface. (Placental site situated on the left fundal wall.) The lymphatics and veins of the broad ligament also contain cocci, as do the abscesses and surrounding tissue.

Comments.—It will be seen that, although the clinical picture pointed to septic thrombophlebitis, none of the veins showed thrombosis, in spite of the fact that they contained streptococci. This can be explained by the very marked virulence of the cocci, inasmuch as was demonstrated by V. Bardelbein's (*Archiv f. Gyn.*, p. 83, 1907), experimental researches that when the microorganisms are very virulent, they pass directly through the veins without producing any local disturbance and enter the general blood current. The local action of the microorganisms on the left side (the ovary and mesovarium) finds its explanation in that the lymph vessels also were involved. Hence, the occurrence of the abscesses in the ovary and mesovarium. It is interesting to note in the pathological report that the placental site was situated on the left fundal wall.

In this case, had no operation been done and the streptococcemia had not, of itself, proved fatal, there can be but slight doubt that a general peritonitis would have developed within a short time, as the abscesses in the left ovary and mesovarium were ready to burst and discharge their contents into the general peritoneal cavity, for there were no adhesions in this area and the omentum was drawn far away from that side, by the only adhesion present, to the right ovarian vessels. Already the toxins liberated had caused a large amount of free serous fluid in the peritoneal cavity and it needed only the setting free of the germs themselves to bring about a *foudroyante* septic peritonitis. There would have been present then, the rare combination of streptococcemia and septic peritonitis, such as occasionally is found described in the literature. A study of the clinical history, together with that of the pathological report on the specimen, should, in our opinion, convince any unbiased mind that the operation saved the life of the patient.

DISCUSSION.

DR. EDWIN B. CRAGIN, in opening the discussion, said: "I would like to congratulate Dr. Vineberg on the result of this case. At the same time I should hate very much to have it go out as the con-

sensus of opinion of this Society that many cases of puerperal infection are to be treated by hysterectomy. Dr. Vineberg, I think, deserves credit for saving this woman's life, and yet if that procedure were followed very often a great many women would be killed that otherwise would get well and a great many would be unsexed that otherwise would retain their generative organs. The cases that can be saved in a general puerperal infection by hysterectomy I believe are very few. A great many of them that look as though they were going to die will get well. There are a few cases where there are abscesses located in the uterus, where Nature is able to circumscribe the process, which you will save by hysterectomy, but I think the mortality is always exceedingly high from this procedure. I know I have lost three out of five and I believe that the number in which it is indicated is so exceedingly small that it must be considered a very rare indication; that the majority of cases will do better if let alone—simply elevating the head of the bed for drainage, giving them plenty of fresh air and not doing harm by opening new avenues of infection; that the cases that are benefited are usually those at the end of several weeks where Nature has been able to localize the process; that it is very rare that you will save them in the first week or the second week. Occasionally in the third or fourth or fifth you will be able to save them if you get at the localization of the process in the uterine wall, but I think that unless you can get evidences of localization of the process, as I think very likely Dr. Vineberg did by feeling a mass at the horn of the uterus in this case and can feel that there is an abscess in the uterus, I think the uterus had better be let alone."

DR. W. H. W. KNIPE presented a report of a case of

PUERPERAL STREPTOCOCCEMIA. RECOVERY.

The patient, aged thirty-four years, a para-vii whose previous history was uneventful except that for one month previous to her admission to the hospital she had been confined to her bed at home, sent for the ambulance because of pains low down in the abdomen upon both sides, chills and fever. The ambulance surgeon upon his arrival at the patient's home delivered her of a strong living female child on January 10, 1916. During the next day the patient was brought to Gouverneur Hospital because there was no one at home to care for her. Upon arrival at the hospital patient's temperature was normal, pulse 106, blood pressure 115; she was fairly well developed and nourished but her face was very pale and anemic. Within forty-eight hours her temperature rose to 105° F. and pulse to 144, and vaginal examination showed the fundus of the uterus six fingers above pubis, hard and contracted, but on either side of the pelvis were felt hard fibroid-like masses which were immovable, not particularly sensitive, which seemed to merge into the lower zone of the uterus and which were designated as diffuse pelvic cellulitis. The lochia was normal in character and amount, the urine from a catheterized sterile specimen showed numerous pus cells, otherwise

normal, acid, sp. gr. 1018, no albumin, no sugar, no casts. The blood showed a leukocytosis of 17,400 with a polynuclear count of 87 per cent. A blood culture was sterile at the end of eighteen hours, but after forty-eight hours' incubation a growth appeared which was finally and definitely isolated as streptococcus hemolyticus. A second blood culture taken four days later also showed after forty-eight hours' incubation a growth of streptococcus hemolyticus. A third blood culture taken thirteen days after admission to the hospital showed no growth and a fourth culture taken twenty-four days after admission showed no growth. The temperature chart shows a typical septic temperature ranging between 99° F. and 106° F., with decided chills lasting half an hour sometimes twice a day, sometimes once in two or three days. The patient's pulse varied between 90 and 144 and she maintained she felt pretty well and complained only of the chills and the sweats which followed. Upon the thirty-seventh day in the hospital the patient's temperature became normal and remained so and she was discharged on the fifty-third day with a uterus of normal size and position. The pelvic cellulitis had entirely disappeared on the right side of the pelvis but on the left side there still remained a small amount of induration.

The treatment in this case consisted in conserving the patient's natural resources by forbidding meddlesome interference and consisted of posture (Fowler's position) to help drainage of the uterus, forced liquid feeding, cold fresh air in the room, an ice cap to the abdomen, some vaginal douching to secure superficial cleanliness of the vagina and the use of urotropin and sodium benzoate for the pyelitis which was also present in this case.

DR. ROBERT T. FRANK, in discussion, said: "There are two points that I would like to emphasize. The first one is that a blood culture taken a short time after any uterine interference is apt to be misunderstood because any uterine interference in a septic case commonly spreads bacteria in the blood stream. The question then arises as to whether these bacteria are able to multiply in the blood or not. Clinical observations have shown that a blood culture taken a few hours after intrauterine irrigation may be positive and that the patient's blood twenty-four hours later remains sterile. Therefore, a blood culture should always be taken previous to any interference.

"The second point is that, although the prognosis in streptococcic bacteremia is grave, still it need not necessarily be fatal, and that particularly in those cases in which local foci, such as ovarian abscess, pyonephrosis or any other abscess develop, the prognosis is much improved."

DR. ASA B. DAVIS.— "I would like to endorse the sentiments that have been expressed here to leave these cases alone. I am very positive about that after watching them for a number of years, and a good many of them, and we get better results from not doing a hysterectomy, not tearing off the veins and not adding to the load that the patient already has. We don't curet them and, so far as

we are able to, we put them on the roof, raise the head of the bed and place an ice bag over the abdomen. We don't douche them. We do insure drainage. We do insure emptying of the intestine and then such diet is given as we can get them to take—a mild diet sufficient for nutrition, stimulation when necessary and beyond that we let them alone.

"Operations do not save many lives in these cases. I think that they destroy a good many. I have tried to convince myself of cases that were suitable to operate upon for pelvic phlebitis and I failed to find one. I think that at the time a pelvic phlebitis is present the harm has already gone beyond that area.

"I'm not a pathologist or a bacteriologist, but we do seem to find cases of streptococcemia of different virulence where we recover bacteria from the blood and yet a considerable number of these cases will get well. I think that is the experience we had while Dr. Harror was trying out the magnesium sulphate solution. For a while he got excellent results, then there came a group of cases where there was apparently no result at all; so it was a negative aid, but for a time we appeared to be getting results from that method of treatment. I recall two cases of abscess of the lung, streptococcemia, where the abscess ruptured out through the bronchi and yet they recovered. One of them was in the hospital seventy-nine days and the other was there eighty days. They were very sick women. At times we got positive cultures from the blood, but at times they were absent, then they recurred.

DR. JOHN O. POLAK.—"I have been very much interested in the report of Dr. Vineberg's case and the treatment employed because it is so different from the plan of treatment which we have been following and I cannot but feel that with the pathology he cited that this was a case that would have gotten well if it had been let alone. I feel that he is to be congratulated on the fact that the patient got well in spite of his surgery rather than he saved her life by surgery. I say this frankly because it has been my privilege to operate on a large number of patients who have been in our service during their acute infection with very much the same history as he has given, at periods of from six months to two years and I have been able to see the inside of the abdomen in these cases and what wonderful protection Nature is able to give with the aid of the omentum. In the case which the doctor described the omentum was already attached and together with the sigmoid would probably have isolated the ovarian abscess. We have twenty cases all of which were carefully cultured, where hemolytic bacteria were recovered both in the uterus and in the blood, with but two deaths, treated by the method Dr. Davis has spoken of. These cases have been worked up very carefully by my associate, Dr. Beck, and I feel that if we can show a series of cases like this which are checked up bacteriologically that we are safer in helping Nature's processes with fresh air and with posture than we are to submit them to radical operation and it is surprisingly few of these cases that need any operation whatsoever and when they do, it is after the acute process has disappeared and

we have a localized focus of pus. In this series there were seven who were operated for local collections of pus by vaginal incision, or an incision just above Poupart's ligament, and I feel that we ought to make it very clear that the best prognosis in these cases is not operation and not interfering with the uterus; and we go so far as this: that while we culture the inside of the uterus in every miscarriage that comes into the hospital, we have never introduced a curet in our service if the culture shows bacteria of the staphylococcus or streptococcus type."

DR. GEORGE G. WARD, JR.—"I would like to ask Dr. Vineberg if in closing he will tell us what his results have been in other cases. He has, I think, been interested in this method of treating streptococcus infections and has operated I believe on a number of cases. I think most of us would be interested to know the number of cases in which he has employed this treatment and the number of cases in which he has had such a good result as in this one. I think he is to be congratulated on the excellent result obtained in this case, but I feel, as the others do, that the patient got well in spite of the surgery."

DR. J. MILTON MABBOTT.—"From a very small experience, I would like to say that I do believe there is something in the vaccine treatment, which may be advantageous and helpful in a few cases and I think probably is harmless in all if we use a proper vaccine subcutaneously in the connective tissue, for the purpose of producing what, in a general way, may be considered an opsonin. I think perhaps that the obstetric teachers of our time have done as the medical men have—they have become too nihilistic on the side of therapeutics, and I believe that the vaccine treatment of bacteremia should be used and have a further trial before it is condemned so generally, as it seems to be at the present time."

DR. HIRAM N. VINEBERG.—"I expected these remarks here to-night. I am not at all surprised and am glad that they have been made because I should hate to be the means of conveying the impression through this Society or through myself that I believe this operation is one that is indicated very often. I can illustrate to you how seldom I think it is indicated by saying that this is the first case I have operated on in two years and I see quite a number of cases of various kinds in our wards, some of them such as have been described here to-night, where I have opened abscesses through the abdomen or have let them alone, and, to satisfy my Brooklyn friends, I have elevated the bed, which I do not think does much good, and employ all the customary measures, but we are sometimes influenced perhaps by the case that we see before and perhaps that is what influenced me here. About two months before I had seen a young woman with pretty nearly about the same history as this one. She was a relative of a doctor and was delivered by a very good man. I think that forceps were used. She was seen by me on the sixth or seventh day with a high temperature and she had a little bit of tenderness on the left side. I advised the people to send her to the hospital for observation and told them that these

cases were of such a character that they required careful watching. I heard nothing further about the case until four or five days later (at which time she had been sent to the hospital) when I was called up and told to go and see her and do what I thought was indicated under the existing conditions. I found a most florid general peritonitis and, of course, I refused to do anything. She was seen by Dr. Flint in consultation. They were very anxious that I should do something, if only to make a posterior vaginal incision, but I declined to do so and stated that if Dr. Flint would give it as his opinion that such an incision should be made I would be willing to do it, but that it was against my advice. She died that night from a virulent peritonitis. She was practically moribund and I haven't any doubt but the conditions were not unlike those present in the case reported to-night.

Dr. Polak, like most of the other gentlemen, did not follow up the history of my case very closely or he would have known that the tongue of omentum was adherent on the right side where there was no abscess but that the abscess was in the ovary and the pus so near the surface that it broke through while I was tying off the vessels on the right side. It seemed as if the pus would have escaped into the general peritoneal cavity within a short time had no operation been performed, and I am as positive as one can be in a case of this kind that the pus would have escaped from that ovary in a short time, and if she hadn't died of the streptococcemia she would have died from general peritonitis, and while I feel confident that that would have been the result in this case, still, at the same time, I am in thorough accord with the most of the gentlemen who have spoken here to-night that it is not an operation that is often indicated and whenever I do this operation it is one which I do with a great deal of hesitation.

"So far as the curettage is concerned, I would say that while, personally, I don't think I would perhaps have done it myself, still from the care with which it was done I do not believe any harm resulted, and I doubt whether in thirty minutes bacteria could have spread into the general system.

"I may conscientiously repeat that I feel this woman's life was really saved because this ovary would have burst and she would have gotten up a general peritonitis, because there were no adhesions on this side and the omentum was drawn over toward the right side.

"In regard to my results, I wish to say that I do not operate on very many such cases, as I have said before. I haven't looked up my statistics. I think I have operated on twelve cases. Seven or eight recovered and I think there were only three or four that I have operated upon that did not recover."

DR. J. MORRIS SLEMONS, New Haven, Conn., then read by invitation, a paper entitled:

THE RESULTS OF ROUTINE STUDY OF THE PLACENTA.*

* For original article see page 204.

DISCUSSION.

DR. ROBERT T. FRANK, in opening the discussion, said: "It has rarely been my pleasure to listen to a more well-balanced paper, balanced between laboratory investigation and clinical observation, and this paper fully proves that such a dual investigation is sure to give results.

"Dr. Slemons has shown us the great importance of examining full-term placenta. I am sure that he is likewise in favor of examining placenta obtained at an earlier period, for instance after abortion. If he keeps on with these examinations even more important facts will be elicited. Doubtless in time he will come across a placenta which will show some abnormality and the patient from whom the placenta has been obtained will eventually develop a chorioepithelioma. Should he be fortunate enough to obtain such a specimen, he may be able to throw light upon one of the darkest subjects in pathology.

"There are one or two points on which I might feel like disagreeing with Dr. Slemons. One of these is that the hilly situation of San Francisco has much to do with premature detachment, because here in New York, where hills are perhaps not quite as frequent, I have seen an equal number of premature separations in a much smaller series of cases.

"As far as the interpretation of syphilitic placenta is concerned, I think that with the Wassermann and with the very readily determined bone changes in the fetus it would hardly pay to make a very painstaking examination of the placenta. Of course in a routine examination, such as Dr. Slemons has made, which will at some future time serve as a basis and a standard, this is necessary. I can fully agree with Dr. Slemons when he says that the placenta is an organ which will richly repay further study, that it has been treated in a very stepmotherly fashion, and that its clinical, its microscopical, its chemical (in which Dr. Slemons did some work a number of years ago) and its physiological investigation will prove of increasing importance."

DR. J. MORRIS SLEMONS.—"I had hoped that there would be some discussion of the Wassermann reaction in cases of pregnancy. Our series of cases is small and I am not sure that we have all the facts. It seems upon the evidence we have that the Wassermann and the placenta agree in 99 per cent. of cases. If this prove true it is very gratifying information. What has interested me particularly is the faintly positive Wassermann in cases of toxemia. I wonder if any one else has been impressed by that experience. As far as I know it has not been commented upon.

"It is certainly a great pleasure to be here and I thank you very much for the cordial reception you have given me."

Meeting of April 11, 1916.

The President, DOUGAL BISSELL, M. D., in the Chair.

DR. GEO. GRAY WARD, JR., reported a case of

CONGENITAL ABSENCE OF THE LEFT OVARY AND FALLOPIAN
TUBE.

Anomalies of the female generative organs, while not rare, are always of interest and therefore, should be recorded in the literature. The following case came under my observation, November, 1915. Mrs. H. K., aged twenty-four, married five years; of medium height and slender build, family history negative and of neurotic temperament, consulted me on account of burning and aching pain in the region of the right ovary. It annoyed her considerably at night, also on standing. She was also anxious to have children. She had never had any serious illness; menstruation established at fourteen years, a regular twenty-eight-day type of seven days' duration without pain and moderate quantity. She had never been pregnant. She had a moderate amount of leukorrhea and suffered with hemorrhoids. The pain complained of was distinctly located in the right lower quadrant of the abdomen.

The examination showed her to be normally developed with thin and relaxed abdominal muscles, with moderate prolapse of the right kidney and some ptosis of the stomach and intestines. Tenderness over McBurney's point. Pelvic examination showed the external genitals of a nulliparous woman normally developed. Two or three external hemorrhoids. The vagina was normal, uterus moderately anteflexed, of normal size and movable. There was marked tenderness of the right tube and ovary; the left tube and ovary were recorded as negative. The vaginal and cervical smears were also negative.

Diagnosis of chronic right salpingo-oophoritis, probable chronic appendicitis and endocervicitis, with moderate degree of enteroptosis was made, and an operation was advised.

On November 12, 1915, I operated upon her, doing a divulsion and curettage and hemorrhoidectomy. The abdomen was opened and the right ovary was found to be undergoing cystic degeneration with areas of interstitial oophoritis. The ovary was the size of a plum and the tube was normal. The examination on the left side showed complete absence of left tube and ovary. A small stub one-quarter of an inch in length was observed at the side of the uterine cornua. The top of the left broad ligament was simply an extremely thin membrane. The appendix was found to be the site of a chronic appendicitis and contained several large concretions. A smooth unattached stone-like body about $\frac{3}{4}$ inch \times $\frac{1}{2}$ inch in width was found lying in the culdesac of Douglas.

Owing to congenital absence of the left adnexa, it was necessary to conserve the right ovary, so resection of the diseased area was

made leaving ovarian tissue that was apparently healthy about the size of a normal organ. The appendix was removed and the abdomen closed. The patient made a normal recovery.

The laboratory report showed chronic oophoritis, and the "stone" which I had at first thought might be a wandering ovary, proved to be simply a calcareous gland.

DISCUSSION.

DR. LEROY BROWN.—"I would like to ask the doctor if that was associated with a normal-sized uterus."

DR. GEORGE G. WARD, JR.—"It was. The uterus was perfectly normal in size and there was no abnormality about it whatsoever. The menstrual function in this woman was practically normal."

DR. RALPH M. BEACH reported a case of

FETAL DEATH DUE TO EIGHT COILS OF UMBILICAL CORD ABOUT THE NECK.

The following case coming into the writer's experience seemed unique enough to be reported. Mrs. C. was delivered by me of her first baby three and one-half years ago, a difficult forceps. The baby died at the end of one month of some infection of the neck, the nature of which I do not know, the case having passed from under my observation. One year later I performed a cervical and pelvic floor repair and a Webster-Baldy operation on the uterus. Her second pregnancy was normal except for considerable pain over the uterus at times, which I took to be due to irregular stretching ligamentous attachments. *One week before term, the patient experienced excessive movement on the part of the baby.* She said this was so marked during the night that she could not sleep, and the baby seemed to be moving in every direction. The next morning the baby had quieted down, fetal life was still present and nothing occurred until the onset of labor, when, *with the first pain all signs of life disappeared.* Pains were irregular for eighteen hours and strong for the last six hours while she was under my observation. No fetal heart was heard on my first examination. The baby rotated from R. O. P. to O. A. without any difficulty and *was born dead with eight coils of cord about the neck.* Contrary to the text-book teachings there was not the slightest amount of extension of the head.

The interesting features about this case are whether the Webster-Baldy and pains during pregnancy had any bearing on the condition, the excessive motility one week prior to term and the fetal death with the first uterine contraction.

DISCUSSION.

DR. ASA B. DAVIS, in opening the discussion, said: "There is one point as a causation for the coiling that I think was not brought out,

and that is the excessive amount of amniotic fluid, so that the child has freedom to move about. Dr. Beach brought out the danger to the child. I think there is still danger to the mother. We may have a cord that is long and wrapped about the child and made relatively short as one of the causes of accidental hemorrhage. I have seen this in several cases."

DR. GEORGE G. WARD, JR.—"I can report a case that bears out what Dr. Davis has just said about the danger to the mother of a shortened cord. A little over three weeks ago I had a case, a primipara, and when she went into labor it was accompanied by sudden severe hemorrhage which was undoubtedly an accidental hemorrhage. The presenting part did not enter the pelvis at all and it looked as though we would lose the child, if not the mother, if the ordinary measures were employed, as haste was evidently necessary. I did a Cesarean section and delivered an 8-pound child without difficulty and both mother and child made a good recovery. In this case the placenta was on the battle-dor type; that is, the cord was inserted into the margin of the placenta and it was coiled around the body of the child and was thus greatly shortened and when labor started the traction on the placenta caused the accidental hemorrhage.

It is unusual to do a Cesarean section for accidental hemorrhage but I felt sure it was the best procedure in this case as it was in a hospital. Perhaps Dr. Davis, who has done so many Cesarean sections, can tell us of his experience with this method of treatment."

DR. ASA B. DAVIS—"I have done several of those cases and my assistant in twenty-four hours last September had two cases where I believe he saved the mother's life by doing a Cesarean section promptly. One child was dead, but that was the quickest way to get it out. The other child was saved and both of the mothers were saved."

DR. HERMANN GRAD—"I had a fetal death from a cord around the neck, but in this case the cord was wound around the neck three times. The neck was very much compressed and the mother said that ten days before she noticed an excessive motion in the abdomen, and two or three days later she felt no life. The baby was born dead. There was an excessive amount of fluid in this case also, as Dr. Davis has called attention to."

DR. JAMES D. VOORHEES—"I can report a permanent injury to a child after being born with a cord wound around its neck six times. This child was born barely alive. There was intense congestion of the face and head, hemorrhages into the conjunctivæ, and one hemorrhage into the anterior chamber of the eye. The hemorrhage in the anterior chamber did not absorb and produced a permanent opacity in the eye. The child bears this mark to-day, being, I think six or seven years of age. Otherwise, the child seems to be perfectly developed and healthy."

DR. DOUGAL BISSELL—"A long cord coiled around the neck is dangerous only when the several coils convert it into a short cord; that is, four loops can be as dangerous as eight provided that all the slack in the cord has been taken up by the coiling. When this is

the case the danger to obstruction in the circulation of the cord during the passage of the child through the birth canal is very great. The very short cord looped once around the neck or over the shoulder is equally as dangerous. I vividly recall a case which I had the misfortune to attend where a short cord looped about the neck resulted in death. The labor was overdue ten days and was then induced. The child was delivered with forceps after great difficulty. The heart action failed to be heard five or more minutes before delivery. The difficulty of the delivery proved to be due to the looping of a very short cord about the neck causing great tension upon it when the child's head was pulled upon, resulting in obstruction to the circulation in the cord and death of the child. A long cord looped about the neck without resulting tension may serve advantageously by preventing prolapse of the cord."

DR. RALPH M. BEACH, in closing the discussion said: "One interesting feature about this case is this excessive motility of the fetus. I don't think we are apt to pay enough attention to this in the latter months of pregnancy. I saw a patient in my office about ten days ago, with a distinct vertex presentation and six days later she went into the hospital in labor and had a breech. She told me that two days before, she had felt all through the night, a lot of motion, turning of the baby, as she thought, and apparently the baby had turned at that time from a vertex to a breech. There can be no doubt about that diagnosis. It was the first time in a primipara that I had seen a baby change from a vertex to a breech ten days before delivery."

DR. REGINALD M. RAWLS reported a case of

INJURY TO THE FEMALE GENITALIA IN COITUS, WITH REPORT OF A CASE OF VULVORECTAL FISTULA.

Mrs. L., aged forty-three, admitted to Dr. LeRoy Broun's service at the Woman's Hospital, January 23, 1915. She was poorly developed and ill nourished and complained of incontinence of feces for nine years. First menstruation at sixteen years, always regular but scant. Claims to have had an accidental abortion when three months married.

External genitals normal except a rather high introitus and an intact, rather thickened, annular hymen whose foramen admitted one finger. In the fossa navicularis was a transverse fistula into the rectum which admitted two fingers. The anterior and posterior vaginal walls were in contact and it was necessary to make a vaginal examination by the aid of sight to prevent the fingers from entering the rectum. The vagina, cervix, uterus and rectum were otherwise normal. The levator ani and sphincter ani intact.

The patient gave the following history as to the cause of the fistula. She was married at the age of thirty-four years, and says that her husband was of average size, of temperate habits and very considerate in his marriage relations. Attempts at intercourse the first night attended with pain and bleeding which lasted

a week. During the second week, at the third or fourth attempted coitus, there was severe pain which caused the patient to faint. Next day, she was unable to control her bowels and there was considerable bleeding. For two years there was always painful intercourse and for the first three or four weeks of married life, there was always considerable bleeding after coitus.

Her husband died at the end of seven years and was never told that he had made a false passage.

Operation.—In considering an operation for this case, I determined to attempt a cure without severing the sphincter ani although the fistula was so close to this muscle as to make the result problematic. The sphincter ani was thoroughly dilated, the edges of the fistula were freshened and the vagina and vulva were separated by blunt dissection from the rectum. Then with three sutures, one on either side and one in the center used as tractors, the fistulous opening in the rectum was pulled down outside of the anus and interrupted sutures of fine linen were used to approximate the mucosa and the underlying fibrous coat of the rectum. These sutures were tied with their knots in the lumen of the rectum. Then from above, the tissues between the rectum and the vulva were brought together with interrupted chromic-gut sutures and the edges of the levator ani were brought together by two sutures to reinforce the fistula. The skin was closed with silk-worm-gut sutures and the hymen was cut away and the mucosa brought together with catgut. The patient made an uninterrupted recovery except for a small sinus which eventually closed.

The interesting points in this case are, the woman was comparatively young, thirty-four years of age, when the injury occurred; there was no congenital nor acquired abnormality except a thickened hymen and a rather high introitus. While we cannot exclude other trauma as the cause of the fistula, it would seem that the hymen or the vagina or both would have been lacerated if the fingers or an instrument had been used. On the other hand, we are unable to exclude a congenital defect in the vulva-rectal septum, although there was no evidence of rectal malformation. Harris in a study of Hirst's case which is similar to this case, says that he has seen rectal cases with a malformation corresponding to the site of the fistula in the fossa navicularis. Nevertheless, we must recognize coitus as the direct cause of the fistula in my case.

DISCUSSION.

DR. HERMANN GRAD, in opening the discussion said: "I had the pleasure of seeing this case of Dr. Rawls and it certainly was a very curious condition. As I remember the fistula easily admitted two fingers, starting right beneath the vagina and extending into the rectum, but the sphincter anus was not destroyed. When I examined this case I observed at the time that the tissues between the fistula and the vagina were very firm, it may be that the transversus perinæi muscle was excessively developed and that the force exerted deflected along this rigid surface."

DR. BROOKS H. WELLS, said: "About a year ago, at a certain hospital with which I was connected, one of the assistants in scrubbing a patient's vagina before an operation, with soap and a piece of gauze over the two fingers, ruptured the vagina and I was called to repair it. I thought at first that the man had been unduly rough, but when I went to put stitches into this torn posterior culdesac it was found to be so tender that the slightest bit of traction on the stitches would pull them through the tissues, and putting a traction of probably not more than 2 or 3 ounces would cause the stitches to cut through, so in that case there was evidently some very unusual cause for this remarkable softness of the tissues."

DR. FREDERICK W. RICE read a paper on

POSTPARTUM HEMORRHAGE.*

DISCUSSION.

DR. GEORGE L. BRODHEAD, in opening the discussion said: "Dr. Rice has brought up a great many interesting points which may well be discussed. I was very much interested in the high percentage of hemorrhage in his placenta previa cases. It seems to me, as he says, that lacerations of the cervix and lower segment are, in many instances, the cause of the more frequent hemorrhages. I think if we could handle these cases a little more carefully and think a little less of the child and a little more of the mother, we would probably have very much better results as far as the mother is concerned. Sometimes, even though the child is dead, an effort is made to extract it rapidly; not enough time is allowed for the cervix to completely dilate. I have seen this happen over and over again, where one might say the cervix was almost deliberately torn in the effort to deliver quickly instead of allowing the necessary time for proper dilatation. The only result of that (and there is only one result) is a laceration of the cervix and hemorrhage. I think in these cases of placenta previa where the patient has already lost a good deal of blood, it is safer to pack, as a rule, than to run the chance of having a hemorrhage succeeding delivery. In my experience harmful results from leaving in retained membranes have been very much exaggerated. During my first year at the Sloane Hospital it was our custom to remove all portions of retained membrane and I can remember many weary hours spent in trying to get out portions of retained chorion. During my second year I made up my mind that I would not enter the uterus for retained membrane, and results seemed equally good. In my private and hospital work ever since I have always followed the procedure of leaving retained membrane alone. The chorion weighs about 3 or 4 drams and that is nothing more or less than the equal of perhaps a small blood clot for which we would certainly not enter the uterus. The membrane comes away in small pieces, or in débris with the lochia and I doubt very much whether we can attribute postpartum hemorrhage to

* For original article see page 215.

the retention of membrane. I think one of the most important things in the prophylaxis of postpartum hemorrhage is giving ergot or pituitrin immediately after the birth of the child and not waiting until the end of the third stage. It requires, by mouth, twenty to thirty minutes for ergot to act; therefore, if we are going to give the drug we ought to give it immediately after the birth of the child, twenty or thirty minutes before the placenta is expelled. I have seen a number of instances where in previous confinements the patient had bled a great deal, ergot having been given after the end of the third stage. In a subsequent labor I followed the procedure of giving pituitrin or ergot immediately after the birth of the child with very different results, and I am convinced that the time to give ergot or pituitrin is immediately after the birth of the child, before hemorrhage has occurred. I cannot recall any instance in which the immediate use of ergot or pituitrin has been followed by bad results."

DR. ASA B. DAVIS.—"As Dr. Brodhead has just said, this paper has brought up a great many interesting points connected with postpartum hemorrhage. One is that even small pieces of placenta may be so situated, left behind, that they will cause hemorrhage. I remember an instance a good many years ago where we found a small piece of placenta, probably not more than a centimeter and a half in diameter, but it was probably so located that it kept open one of the sinuses and we had persistent postpartum hemorrhage until its removal, after which the hemorrhage ceased.

"There is another point that the speaker has brought out and that is the matter of packing in these cervical tears. I don't think enough attention is given to the futility of packing in those severe tears, and I am sure that a great many women have lost their lives by relying upon that method of packing in hemorrhage. I have seen it happen in a number of cases which I can recall. We cannot pack against arterial bleeding from the cervix and above. What has usually happened? The fact that there is thought to be a necessity for packing indicates that a great deal of blood has been lost before, and packing is applied to this not overresistant area, and, therefore, the uterus and vagina are usually packed and the hemorrhage is concealed for a time, but continues; the gauze is moistened and ceases to exert pressure at the site of the bleeding and after an hour or so we are conscious of the fact that the woman is bleeding again through the gauze and repacking is sometimes done. Whereas if we would recognize the futility of this and even if we cannot get good apposition of the tissue, place a few large sutures with the idea of stopping the hemorrhage, rather than to get good repair, in that way hemorrhage may be efficiently checked."

"There is another point with regard to the packing of the uterus in the correct and incorrect method. There is an accident that occurs that was not mentioned, and that is the uterus may dilate above the packing. I have seen a few instances of that and I undoubtedly believe had it not been recognized and compression

applied, the uterus manipulated and compressed down upon the packing, the patients would have lost their lives. You can pack the uterus completely full, yet it will expand above the packing.

"There was one other point which I forgot to mention and that is a type of hemorrhage which we see which is not very profuse and which if it is prolonged for any time becomes dangerous. We find it with the patient in the lithotomy position, and we apply methods of treatment, hot douches and that sort of thing, and still the bleeding keeps on, whereas if we place the patient in the horizontal position with the knees together, the hemorrhage will stop. I think that is due to the fact that the blood-vessels are congested by the flexure of the thighs upon the abdomen, but in the prone position the circulation regains its equilibrium and the hemorrhage ceases."

DR. HENRY C. COE.—"It seems to me that if we are to apply ordinary surgical rules in these cases, instead of wasting time by using gauze in accessible venous and arterial hemorrhage in other localities, it is better to pass deep sutures beneath the vessels. I never think of wasting time with douches, but introduce my whole hand in order to locate the source of the hemorrhage and pull down the uterus, and if I have any doubt at all about its origin from the cervix or other soft parts I suture. I have seen cases in which alarming hemorrhage was entirely controlled by suturing where great time would have been lost in packing. Of course packing is necessary in cases in which the uterus is relaxed. I would introduce a pack at once with my whole hand and not use an instrument, making pressure, as well as traction."

"I was much interested in Dr. Brodhead's statement that he gave ergot or pituitrin before the placenta was expelled, as I have always taught my students not to give it until the uterus was entirely empty."

DR. AUSTIN FLINT.—"I think this is an important subject to bring before the members of the Society. It struck me that there are two or three things which might be amplified in the discussion. Packing is valuable when properly done, but dangerous when improperly done. It must be carried up to the fundus. I have used packing very moderately as far as frequency is concerned. I regard packing for postpartum hemorrhage more as a prophylactic measure, to prevent the repetition of hemorrhage, rather than a measure to control a hemorrhage that is active. If you have postpartum hemorrhage from the placental site in a relaxed uterus, you should cause the uterus to contract, and again the rational thing to do to prevent repetition of hemorrhage is to keep the uterus retracted, or at its normal size, and the best way to keep it retracted is to pack it, rather lightly, but thoroughly with iodoform gauze or sterile gauze. Apply the gauze up to the fundus. In that way I think it is one of the most valuable procedures that we have to save the woman from the dangers of repeated postpartum hemorrhage and hemorrhage that recurs.

"Dr. Rice brought out the value of packing in placenta previa.

At Manhattan Hospital, where we have all been working for a good many years, at one time we packed as a routine procedure for placenta previa and got very good results, and then for a time we gave it up and used it only in cases of placenta previa followed by postpartum hemorrhage. Then we went back again to packing as a routine procedure and we again got very good results. In the treatment of postpartum hemorrhage from the standpoint of preventing it, we now pack in placenta previa cases. From the standpoint of prophylaxis as I have gone over it in other cases, the treatment of a threatened postpartum hemorrhage is most important. As one acquires more skill in the practice of obstetrics, less frequently does one meet with postpartum hemorrhage. There are certain conditions where we feel that hemorrhage is likely to occur, such as rapid emptying of the uterus, overdistention of the uterus, twin pregnancies and the frequency with which hemorrhage occurs in operative delivery, all those are conditions which make one feel that they are the cases in which hemorrhage may occur, and one takes measures to prevent it, and, consequently, as time goes on, hemorrhage occurs less and less frequently. There are, however, certain cases, such as hemophiliacs, where ordinary measures will not answer. In those cases you must use unusual measures to see that the uterus retracts and stays retracted during the third stage and you should promptly deliver the placenta rather than let it stay for as long a time as in normal cases.

"There are a great many smaller points which I will not take up the time of the Society in going over. I only want to emphasize what Dr. Rice brought out very well, namely, the value of packing, not only for the control of postpartum hemorrhage, but also for the prevention of such a condition."

DR. HIRAM N. VINEBERG.—"I wish to mention a case of secondary postpartum hemorrhage occurring twelve days after a rather difficult delivery with forceps, in which there was a primary postpartum hemorrhage due to a pretty severe tear on both sides of the cervix, which was controlled rather promptly by suturing. In the first instance the patient was very much exsanguinated and was given an intravenous infusion of salt solution and made a good recovery. She was allowed up on the eleventh day and on the twelfth day she was up for an hour or so. Just after taking supper she felt a rush of blood coming from the vagina and sent for me. I happened not to be at home and reached there without any instruments. The patient was practically exsanguinated. I packed her with what gauze I had at hand and was very glad that she did not die then and there. We sent for assistance and gave an intravenous saline infusion, but still there was no pulse to be felt at the wrist. The patient complained constantly of air hunger and was vomiting, and I felt that if something were not done for her she would die. Fortunately I was able to get some one to give an intravenous blood transfusion which worked wonderfully well and the patient immediately got some color in her lips and we could feel her pulse. By that time the packing had become wet and blood was trickling through. I

determined not to leave the patient until the source of the hemorrhage was found and arrested. Against the advice of all the men who were called in from the neighborhood (there were no consultants, but six or seven men and they all begged me to leave the patient alone, saying that she would die if I did anything to her), I decided to try to stop the hemorrhage. The patient was stout and I had considerable difficulty to expose the parts. In removing the gauze from the vagina I found a good sized blood-vessel on the right side of the cervix where former suturing had been done. Evidently the vaginal wall had eroded over this blood-vessel and it was bleeding at a great rate. I succeeded in ligating the bleeding vessel and the patient made a good recovery. I felt that if I left the house that night without arresting the bleeding the patient would surely have died, but what really saved her was the fact that we were able to do a prompt blood transfusion. The brother of the patient, a robust individual, gave his blood for this purpose. We used about 500 c.c. by the citrate method. The only bad result following the transfusion was a severe chill which the woman experienced. She had no hematuria, but did have an albuminuria for several days following the transfusion.

"I recently had another experience which, fortunately, turned out better than we had anticipated. The patient was a young woman who was very stout, a primipara with a distinct hemophiliac history and the daughter of a hemophiliac, she herself bleeding from the nose, eyes and mouth and having menstruation of a profuse type. She had a difficult labor but everything passed over smoothly; that is, she had not lost any more blood than the ordinary individual. There was a persistent occipitoposterior and I had to apply the forceps when the head was on the perineum and the perineum was torn extensively and was sutured. This is the twelfth day and there have been no signs of any trouble. The child was a female, and although the forceps were used there was very little traction made but on the third day after delivery one of the child's cheeks became enormously swollen and it seemed that the swelling was increasing to a very great extent. The baby was not able to nurse and kept crying constantly. A serologist was called in consultation and he advised giving the baby a blood transfusion. This was done and the hemorrhage into the cheek has evidently ceased and the little patient is making a nice recovery. There was a slight scratch on the inside of one of the ankles, which continued oozing, not to a great extent, but it could be controlled, showing that the baby is a hemophiliac also."

DR. HAROLD BAILEY.—"One point in the etiology of postpartum hemorrhage occurs to me. I think that massage of the uterus immediately after delivery of the placenta should be discarded. The uterus is a muscle and is not supposed to remain in contraction indefinitely. If it is let alone it contracts and then relaxes. After constant massage immediately upon relaxing it contracts again and finally the muscle becomes tired out and very considerable relaxation occurs with hemorrhage.

"If there is a postpartum hemorrhage of any considerable amount, no time should be lost in instituting treatment by packing. We should introduce a speculum or the hand, for the purpose of locating the bleeding and if it is from the uterus it should be packed at once, and at the same time that the hemorrhage occurs I think pituitrin should be injected. Going into the question of late postpartum hemorrhage, on the twelfth, fifteenth or even the twenty-fourth day, I believe that the uterus should be thoroughly curetted. I had a case recently with a very severe hemorrhage and in scraping out the uterus a large piece of placental tissue was removed and on examination it was found that there was considerable development of syncytial cells."

DR. RALPH H. POMEROY.—"There has been a great deal of discussion of placenta previa hemorrhages here to-night which is a rehashing of old stories. I have been looking for some new things. I have been struck by three new points which have perhaps helped me to get a clear understanding of the subject. They are enlightening, but not final.

"One thought that was presented by the reader of the paper is that in the management of placenta previa postpartum hemorrhage, he accepted the proposition that he must have a contracted musculature of the uterus in order to cut off the active arterial circulation to the bleeding point. It would appear to be pretty definite that hemorrhage from an unretracted lower uterine segment in placenta previa postpartum hemorrhage more likely comes from the vaginal trauma, and must be controlled by packing, and one cannot really in the contraction and recontraction of the upper part of the uterus control that situation.

"Another point that I want to ask a question about is as to whether Dr. Flint, in speaking of routine packing for postpartum hemorrhage in placenta previa said that the packing was carried out from the fundus down or only in the lower part of the uterus."

DR. FLINT.—"From the fundus down, doctor."

DR. POMEROY.—"I want to exclude from the two or three statements I wish to make any consideration of the purely surgical postpartum hemorrhages—those due to lacerations of the cervix and lacerations of the vagina and vulva.

"In talking to students and to people whom we advise it is absolutely necessary to get into their minds the distinct character of hemorrhages from the placental site and the necessity of having a clear comprehension of how to deal with them.

"The next thought is that we must make an absolute division in our own minds between the cases in which postpartum hemorrhage may be reasonably expected and those in which it is totally unreasonable to expect it, and we start with the proposition that a uterus that has not been overdilated primarily, that has not been the subject for exhaustion, for prolonged labor, or an anesthetic, or multiparity, may be considered able to take care of itself, for nobody tampers with the second stage.

"Dr. Beach and others of us who have been working over in

Brooklyn have thoroughly thrashed out the proposition that there is such a thing as a conservative letting alone of the third stage, but you must have excluded the types I am referring to. That doesn't clear up the entire matter because that has to be dealt out to students and midwives and juniors and all kinds of men who are the temporary house surgeons or house obstetricians, because if we tell them that no case will bleed seriously and that you don't do anything in the third stage but let the patient alone, our house surgeon, sooner or later, shows incompetence to identify the cases that are potentially dangerous.

"Now, most of us have gotten to the point where we don't see a great number of labor cases through their labors. We see them after some disastrous condition has developed and we get out of the habit of thinking of this classification and frequently when we do think of postpartum hemorrhage we think of a disastrous condition following postpartum hemorrhage that ought never to have occurred in the first place."

Here the doctor referred to the prevention of postpartum hemorrhage, and, continuing, he said:

"There is no good uterus but an empty uterus and a uterus once emptied of its contents totally should never be allowed to expand or dilate without being lifted up bodily out of the pelvis into the upper abdomen, thereby making traction on the uterine arteries. Have the vaginal vault packed full of gauze into the uterus and watch the fundus and hold it between the two hands as a whole uterus and pull it out of the field. I have never seen a uterus managed in this way get away from me."

DR. FREDERICK W. RICE, in closing the discussion, said: "Dr. Brodhead's remarks on pituitrin are interesting. In looking over the cases of retained placenta, seventy-six cases, a large number of these received an injection of pituitrin during the second stage. I don't think it ever did any harm. If it caused retention of the placenta even for an hour, I do not think it would necessarily mean postpartum hemorrhage, but delayed separation.

"In regard to Dr. Bailey's remarks relative to massage, I think that is often a mistake. It is wrong to massage the uterus during the period when it should be separating the placenta, because I think that massage then really acts the same as ergot or pituitrin—produces tonic uterus and delays separation.

"Dr. Pomeroy's remarks in regard to what we must tell the students are interesting. It has always been a question with me what to tell the students in regard to packing. I feel that if they ever attempted in a case that really needed packing, to control the hemorrhage without having sufficient training, they would do more harm than good.

In regard to our knowledge of the condition of the patient before the third stage, and in estimating whether hemorrhage will take place or not, as in twins and hydramnions by causing overdistention of the uterus, I don't think these have so much effect in causing postpartum hemorrhage as they do in producing a prolonged labor.

We have had only two postpartum hemorrhages in 175 cases of twins. At this point in the discussion the doctor commented on the question of twins and hydramnions producing a uterine inertia and the uterus at the beginning of the third stage not being prepared to do its work properly. In regard to letting the third stage alone, it is interesting to note that out of 1006 cases that precipitated in the outdoor service hemorrhage occurred in only three cases and then it was not serious enough to endanger the patient or child. There is usually somebody in the house who knows how to prevent overdistention in these cases by keeping a hand above the fundus until the doctor arrives."

DR. PERCY WILLIAMS read a paper on

PSYCHIC VAGINISMUS, WITH REPORT OF TWO CASES.*

DISCUSSION.

DR. HENRY C. COE, in opening the discussion, said: "I would like to suggest as an aid to the mental suggestion the use of the old-fashioned Sims' dilators, beginning with the very smallest size and giving the patient three sizes to introduce herself. I have used these in two cases quite similar to those mentioned by the reader of the paper. By first introducing a small and then the larger ones the patients were convinced that there was no real obstacle to coitus."

DR. BROOKS H. WELLS.—I have had very recently under my care a case of purely psychic vaginismus. The patient was a young woman who before marriage had read and been told a good deal about the discomforts that would follow marriage and who was in deadly fear of becoming pregnant. Penetration occurred the first night after marriage and was extremely painful to both. Since, there have been many attempts at intercourse but no penetration. She had been given large doses of bromide with no benefit, and intercourse had been unsuccessfully attempted while she was deeply under the influence of morphia and alcohol. On being brought to me she showed a typical condition; there was extreme contraction of the muscles of the pelvic floor, with adduction of the thighs following the approach of the examining finger. It was impossible to make any examination until the woman was deeply anesthetized, when it was possible to pass three fingers into the vagina and to dilate the vaginal orifice and pass in the whole hand without tearing the mucosa. The dilatation had no effect on the vaginismus, and as the internal pelvic organs were normal, I decided the matter was purely psychical, and treated her by passing twice a week, first a very small and then larger specula until after a month a rectal bougie three and a half centimeters in diameter could be inserted without pain. To prove that she could easily allow intercourse she was then allowed to take the bougie home and pass it herself. In spite of that, though she could pass the bougie easily and was convinced there was no obstacle, yet when her husband came anywhere near her she got the

* For original paper see page 226.

same old spasm. Several weeks later, after the next menstrual period, the husband called up and said: "Everything is all right."

DR. WILLIAM M. FORD.—"Within the past six weeks I have seen two cases of typical psychic vaginismus. The first had been married a year and a half and had never succeeded in having intercourse. Inspection showed a thin imperforate hymen just admitting the tip of my index-finger. The other case was that of a young woman who had been married nine months and had never succeeded in cohabiting and in this instance the hymen was exquisitely sensitive and the opening in the hymen was just large enough when stretched to the utmost to admit of the passage of my index-finger when well anointed with vaseline. Upon succeeding in this, that is, in introducing my finger, I was tempted to make a further examination of the pelvic contents with the result that I found the woman was four months pregnant. As these two cases came under my observation within the past six weeks, and as I have seen others occasionally, I infer that the condition is not particularly rare."

DR. HAROLD BAILEY.—"Before turning these cases over to the psychiatrist or specialist in nervous disorders I think we ought to consider another method because, associated with another, I have seen two cases cured by forcibly dilating the vulva. Both cases were followed by intercourse and pregnancy and both are now well. One case was so severe that attempts at intercourse in the first few weeks of marriage had led to intercourse through the rectum rather than through the vagina. The first case went through her labor without any trouble, but had through her pregnancy symptoms of vaginismus, on examination. The second case had a breech delivery and a severe laceration of the perineum."

DR. HERMANN GRAD.—"I believe the classification given by Dr. Williams is a very good one. I am convinced that there are cases of vaginismus due to organic disturbances and also to purely mental conditions. This was shown to me in a patient of mine, a young lady, who said that she simply could not have any intercourse with her husband, although she desired it. She was forced into marriage with her husband against her will. After a while her husband died and she married another with whom she had absolutely no vaginismus. It was purely a mental state that prevented her from having proper intercourse."

DR. WILLIAM H. W. KNIPE.—"I saw a case in my office where the woman had been married for fourteen years and yet had never had complete intercourse with her husband. Her hymen was still intact. Fortunately, she is now pregnant and that will cure the condition."

DR. WILLIAM P. POOL.—"It was Kelly, I think, who has classified these cases as hysterical where there is a voluntary effort at repulsion, such as adduction of the thighs, which is not infrequently encountered in attempts at examination; and the cases as local where there is an involuntary contraction, or what appears to be an involuntary contraction, of the muscles of the pelvis, and states that only the latter cases are subject to local treatment."

DR. DOUGAL BISSELL.—“I can add another case of psychic vaginismus to those reported here to-night. A case of a married woman where intercourse was not accomplished until several years after marriage because of intense pain on approach. The marriage was one of convenience, the woman not deciding to accept her suitor until ten years after courtship began. After years of physical and mental distress, Thomas' vaginal glass dilators of varied sizes were used. One intercourse was then permitted and soon after a child was born. The child was delivered persistent occipito-posterior, the vagina was badly torn and the repair was not altogether satisfactory. Although two of the examiner's fingers can be passed into the vagina without occasioning the least distress the same difficulty is now experienced as before the use of the dilators when intercourse is attempted.”

DR. P. H. WILLIAMS, in closing the discussion, said: This discussion has brought forth many interesting facts. I wish only to repeat what I have tried to make clear in the paper, namely, that after all cases of vaginismus, in contradistinction to dyspareunia, have been investigated and those suitable have been treated by surgical means, there remains a not unconsiderable proportion which are not organic and whose symptoms are not helped by surgical treatment. These cases I term psychic and are best treated as neuroses or phobias. I do not advocate turning cases of vaginismus over to the psychiatrist as one member suggests, for a competent gynecologist ought to be able to treat these cases himself.

The crux of the matter is in the diagnosis, which can only be reached by exclusion and the use of infinite patience. The treatment follows the diagnosis logically. Most of the cases cited seem to me to be cases either of dyspareunia or organic vaginismus, but I think we have all had cases where an organic basis for the symptoms is impossible to determine.

TRANSACTIONS OF THE BROOKLYN GYNECOLOGICAL SOCIETY.

*Meeting of April 7, 1916, the President, W. P. POOL, M. D., in the
Chair.*

DR. LEO. S. SCHWARTZ reported a case of

CONGENITAL ABSENCE OF THE EXTERNAL EAR.

This baby, seven weeks old, was born without any evidence of an external ear on the left side except a small portion of the lobule. The baby was otherwise healthy and there was no history of deformity in the family. If the x-ray examination showed an internal auditory canal this would have to be opened up later and a plastic operation done. There were no abnormal happenings during the labor.

DR. F. C. HOLDEN reported the following cases of

ECLAMPSIA.

1. Mrs. M. M., aged thirty-seven. Patient was brought to the hospital, December 10, 1915, 11.30 A. M., semi-comatose, and history was obtained from the husband.

Patient had been in excellent health until four years ago, when she had a miscarriage, followed by a severe infection. She was ill for several weeks at that time. Last full-term pregnancy was ten years ago. Present pregnancy, the last period was about eight months ago. Patient had been fairly well until the evening before admission, she had been under the observation of a physician, who had constantly found a small amount of albumin in the urine. The evening before admission, patient began to have severe headache and sense of depression in the chest; she was unable to lie down, and walked about all night. She became much worse and was brought to the hospital. The patient was a rather obese middle-aged woman, semi-conscious, breathing stertorously. She appears to understand questions, but could not answer. Pupils contracted, equal, reacted to light and accommodation. There is a slight palsy of the left side of the face. Patient was quite restless, she tossed right upper and lower extremities about, but the left side was immobile. The face was quite puffy. The heart showed no apparent enlargement, sounds slow, regular and forceful, no murmurs. There was a slight accentuation of second aortic.

The respirations were vesicular, with many moist rales, large and small, particularly in the posterior portion of the chest. Pulse, 50, regular, good volume, moderate tension. The abdomen was obese, fundus reached to four fingers' breadth below the xiphoid. A small child was present in L.O.A. position, fetal heart 146. The left lower extremity was spastic, with great increase in the reflexes. There was edema of both feet and legs. Babinski and ankle clonus on both sides, more marked on the left. The blood pressure, on the right side was 155, on left 140. Patient was catheterized, and about 2 ounces obtained. Urine boiled almost solid and was full of casts of all descriptions.

Immediately on admission patient was wrapped in hot blankets and surrounded with hot-water bags, was given three drops of croton oil. She began to perspire somewhat, but general condition did not improve, patient becoming more comatose, breathing more stertorous, large rales appearing in the chest and throat. Since it was felt that the patient was suffering from a severe nephritic toxemia, and was rapidly getting worse, and since it was apparently necessary to empty the uterus as soon as possible, it was decided to do a vaginal hysterotomy, which was done about two hours after admission. A live child about four to six weeks premature was obtained. Patient was returned to the ward in condition no worse than before operation. Patient did not rally, breathing continued stertorous and chest gradually filled up. Pulse was 140, blood pressure 142, directly postoperative. Patient failed rapidly and in spite of all stimulation died at 8 p. m.

2. A Polish woman, aged thirty-two. Admitted January 25, 1916 at 9 A. M. Patient comatose and history obtained from husband. Patient had had the last period about seven months ago, and had had a normal pregnancy until three days before admission. At this time she began to complain of headache, which continued off and on until evening before admission. Patient also vomited several times. About 6 P. M. on the evening before admission, patient began to have rather severe pain in the abdomen and a midwife was called. Patient was considered in labor and was put to bed. At midnight pains ceased and patient fell asleep. About 4 A. M. the husband of the patient was awakened and found her in a convulsion, after which she remained unconscious. From that time until admission to hospital at 9 A. M. she had seven more convulsions, and continued unconscious between them. Just before admission an outside physician had attempted to manually dilate the cervix with ether anesthesia.

On admission, a well-nourished woman, deeply comatose, breathing stertorously, reacted only to strong stimulation. There was considerable edema of the face and eyelids. Pupils were moderately contracted, but reacted to light. There was marked effusion of the ocular conjunctivæ. Heart and lungs negative. Abdomen showed a uterus extending just above the umbilicus, small fetus in L.O.A. Heart sounds not heard. There was moderate edema of the feet and legs. Pulse varied from 96 to 120, regular, high tension. Vaginal examination showed a nulliparous introitus, cervical canal about 2 cm. long, small bilateral laceration. External os admitting one finger into the uterus. Patient was catheterized, and about 6 ounces of urine obtained. This boiled solid, contained numerous hyaline and granular casts. During the vaginal examination, the woman had a slight general convulsion. The patient was immediately surrounded with hot blankets and water bags, was given *veratrum viridi*, M.v., stomach lavaged and magnesium sulphate 2 ounces left in stomach. Patient immediately began to eliminate well, perspired freely and shortly afterward had two large fluid defecations. Blood pressure, however, rose to 200 mm., but after venesection with 16 ounces of bleeding was done, this dropped to 168.

It was now decided to introduce a Vorhees' bag and to try to induce a rapid labor. However, while patient perspired freely and had several large fluid bowel movements, she did not recover consciousness and had only an occasional uterine contraction. At 3.30 P. M., three hours after the introduction of bag, it was decided to do an anterior vaginal hysterotomy. Patient was accordingly taken to operating room, and under light ether anesthesia, a vaginal hysterotomy, followed by version and extraction, was done. Just before operation, blood pressure was 168, pulse 100-120. After operation, blood pressure rose to 175, pulse 120-130.

Patient still continued comatose, slightly restless at times and did not improve. At 8.30 P. M., blood pressure had risen to 217 mm., and *veratrum viridi* M. v. given by hypo. One hour later blood pressure dropped to 192 mm.

During the night following the operation, patient continued

comatose, edema of face and conjunctivæ became more marked, patient perspired freely, and several times voided small amounts involuntarily.

There was little change in patient during the day following operation and coma deepened. Blood pressure ranged about 170, in spite of all treatment and continued thus until exitus. About midnight, two days after admission, temperature rose to 108° F., pulse gradually grew weaker, lungs became full of moist rales, and patient expired at 1.40 P. M. 1/28/16. Eighty-two hours after first convulsion.

Autopsy findings, moderate edema of brain with few punctate hemorrhages. Slight enlargement of liver, with slight amount of perilobular degeneration. Large white kidney—parenchymatous degeneration.

DERMOID CYST.

Miss A. W., aged forty, menstruated first at fourteen. Twenty-eight-day type. Four-day habit. No pain. First seen April 1, 1916, when the following history was obtained:

In June, 1915, after rising in the morning she was suddenly seized with severe abdominal pain, especially located on the right side, approximately at McBurney's point. This pain was followed by persistent vomiting. She was told at the time that she had appendicitis. A few days' rest in bed and she was about again. She had had five similar attacks up to the present time. On Saturday morning, April 1st, immediately after getting up she was seized with excruciating pain followed by vomiting, as on the previous attacks. Temperature was 100, pulse 90, some rigidity of the right rectus. By rectoabdominal examination, a fluctuating tumor was found extending across the abdomen, side to side and to within 3 cm. of the umbilicus. As the pain had then subsided, the only treatment was an ice bag, quiet, and starvation. On Wednesday, April 5th, she entered the Brooklyn Hospital. Catheterization was done to eliminate the possibility of distended bladder. Blood count showed leukocytes 26,000, polynuclear 85 per cent. Blood count done to-day 21,000 and 86 per cent., temperature not above 99 since entering hospital, nor pulse above 90. Through a long right rectus incision extending from the symphysis to 1 inch above and to the right of the umbilicus, a large ovarian cystoma 18 X 10 cm. was removed. The walls of this tumor were very intensely ingorged and ecchymotic. The fimbriated extremity of the Fallopian tube had appearance resembling a tubal abortion. Right salpingo-oophorectomy was done and the abdomen closed in layers. The specimen here presented was incised and a large amount of thick yellow turbid fluid evacuated and two balls of hair found, and in the cyst wall a small hard bony substance can be felt.

DISCUSSION.

DR. HUSSEY.—I saw a case of eclampsia go from just before noon on a Tuesday to noon on Friday and recover, a little over seventy-

two hours. This patient was delivered after the third convulsion.

DR. BEACH.—One eclamptic at the Williamsburg Hospital had thirty-nine convulsions after delivery during the course of eighteen hours and recovered. She was comatose about three days.

DR. O. PAUL HUMPHSTONE presented a case of

OVARIAN CYST WITH TWISTED PEDICLE COMPLICATING PREGNANCY.

Mrs. ———, Methodist Episcopal Hospital, aged twenty-nine, U. S., white, para-i, was admitted to my service with the following history.

Her family and past history was negative. Her menstrual history began at twelve, always regular, five or six days. No pain, normal flow, after marriage the same.

She was married eight months and then missed her period and suffered the symptoms of pregnancy.

She first consulted me when five months pregnant and in a routine examination a mass was discovered the size of a large orange behind the uterus dipping into the culdesac and the diagnosis of a complicating ovarian cyst was made.

She was told of the complication and desired very much not to have anything done which might terminate the pregnancy, so it was determined to allow the case to progress to term if possible and then to deal with the situation as might be necessary. She went on to the seventh month and first week, and was suddenly seized while in bed at night with severe cramping pain on the left side and the back. Examination showed considerable tenderness over the whole abdomen and some rigidity from peritoneal irritation. Slight pain continued but not like labor pains and the next day on a diagnosis of twisted pedicle cyst, she was prepared for laparotomy. Upon opening the abdomen the cyst was found to be as large as a man's head twisted and dark colored. It was impossible to displace the uterus and deal with the cyst so a hysterotomy was done and the baby and placenta removed and the uterus sewed up and then the cyst was very easily dealt with, by ligation of pedicle and removed *in toto*.

The patient made an uneventful convalescence. The baby weighed 3 pounds and 1 ounce, but died from atelectasis six hours after operation.

The case is of interest to us in this particular: When a diagnosis of ovarian cyst is made during pregnancy the best time to deal with it is at once, if we had done an ovariectomy at once when we first saw this case the uterus would not have interfered with our removal of the cyst. True she might have aborted, but increasing experience and case reports show that single ovariectomy during pregnancy generally does not lead to abortion if proper precautions are taken.

DISCUSSION.

DR. POMEROY.—Two months ago I removed a dermoid cyst about the size of a goose egg, from a patient five months pregnant. The

tumor could be felt *per vaginam* adherent in the deep pelvis to the left of the cervix. It was removed through a small left rectus incision at the level of the fundus. The patient has every prospect of having her baby at the usual time. There could not possibly be any twisting of the pedicle in this case because the local adhesions characteristic of dermoid cysts prevented rotation. It could easily have been removed vaginally but the risks of causing an abortion, and the indeterminate nature of the mass made it more sensible to remove it as we did.

DR. HOLDEN.—My experience is the same as that of Dr. Humpstone. I believe that all such growths should be removed at once where they are large enough to give symptoms. In the last six months I have seen two of these cases. One at the Greenpoint Hospital had a large cyst adherent to the abdominal wall. The other was sent to the Long Island College Hospital and proved to be similar to the one in Dr. Humpstye's case. The patient aborted three weeks postoperative.

DR. VICTOR L. ZIMMERMANN read a paper on

PREGNANCY COMPLICATED BY CANCER OF THE CERVIX.*

DISCUSSION.

DR. HUSSEY.—My experience is limited to the single case which Dr. Zimmermann has recited. It was a most instructive one in many ways and the diagnosis was suspected before examination. She was examined at another hospital two months before coming to us and was reported to be in normal condition, so the growth was evidently of a rapid character. A point of interest that I might bring out is that while we were doing the operation, an examination of a piece of the growth was made by the pathologist by frozen section, and the hysterectomy followed his report, which confirmed the clinical diagnosis.

DR. WALTER B. CHASE.—I desire briefly to report a case of cancer of the cervix which came under my care twenty years ago, and perhaps if I read the published report it will better portray the condition: During March, 1896, a married woman, multipara, aged forty-two, came under my observation with typical cancer of the cervix, accompanied with extensive involvement. Hemorrhage was violent and the patient was cachectic. She was greatly exsanguinated and very weak. She entered St. Johns Hospital in March and I did a high galvanocautery amputation as soon as her health permitted. She made a slow but satisfactory recovery as far as the healing and local symptoms were concerned, and after two or three months she was able to resume her family duties. In November of the same year she entered the Bushwick Hospital for extirpation of a large gland of Bartholin. At this time there was no sign of the return of the cancerous growth. On June 16, 1897 she reentered the Bushwick Hospital being seven months pregnant. The disease

* For original article, see page 251.

had returned, springing up around the old stump. After watching its behavior, I feared, from the hardening and infiltration of the uterine and continuous structures, labor might induce rupture of the uterus, and on July 18th, at the eighth month of pregnancy, I removed the diseased growth, which encircled the uterine outlet, by the thermocautery. No shock followed and the patient was delivered of a healthy living child on August 6. Her convalescence from the confinement was satisfactory, as was the healing after the cautery. She enjoyed good health for nearly a year. Then the growth reappeared and she entered the Central Hospital June 21, 1898, and I removed as far as possible the cancerous mass which had returned. The healing was not satisfactory and she died a few weeks later from a cerebral embolism, which only anticipated the inevitable result of her condition. Dr. Spence hoped to be present to-night and report a case of a woman of great interest, two and one-half months pregnant, in which he first used the thermocautery and burned away a large portion of the cervix, and then did a panhysterectomy; and directly after I did a prophylactic radiation in the hope of preventing a recurrence of the trouble.

DR. POOL.—I may add to the cases reported here another of the same kind. A number of years ago there was treated in Dr. Jewett's clinic a case of pregnancy about term, complicated by extensive adenocarcinoma of the cervix. A Cesarean operation was done and the uterus removed. At the time of the operation, I recall, there was little infiltration about the cervix, but at the time of her discharge, several weeks later, there was an extensive infiltration throughout the pelvis, which was believed to be at least in part malignant. She left the hospital in bad condition and against advice. I had the opportunity to examine this patient about a year later, and to my surprise, found her in good general health and comfort. There was still some evidence of pelvic exudate, but it had almost disappeared. Whether she had a recurrence later, I do not know.

DR. ZIMMERMANN.—The case related by Dr. Chase is very interesting, but he could hardly have done a high amputation of the cervix after Byrne, if pregnancy occurred later, as the internal os and part of the corpus are removed by that method. The vaginal hysterectomy by Fritsch was done after delivery with forceps, and not after hysterotomy.

DR. A. A. HUSSEY read a paper on

THE MANAGEMENT OF PREGNANCY AND LABOR COMPLICATED BY HEART DISEASE.*

DISCUSSION.

DR. LOHMAN.—Dr. Hussey has asked me to discuss this paper, but after listening to the able presentation of the subject which he has made I confess that he has not left much to say. There are several

* For original article, see page 240.

points that might be emphasized. I should like to take exception to the statement regarding the diagnosis of broken compensation in pregnancy. We all know that the normal pregnant woman may have dyspnea, with swelling of the legs and the other common signs of heart involvement and it is not always easy to determine the exact cause. I think that many of the patients have edema of the base of the lungs, together, sometimes, with enlargement of the heart, enlargement of the liver, rapid irregular pulse, and I think these symptoms should be looked for rather than edema and dyspnea. The literature shows very definitely that most organic heart lesions, in pregnancy, go unrecognized and probably most go through labor without difficulty. One point in the diagnosis that Dr. Hussey has mentioned which impressed me is the pronounced tendency of these patients to toxic symptoms. I think that the majority of cases I have seen of cardiac failure in pregnancy have shown toxic symptoms; high blood pressure, 180 mm. to 200 mm., especially in mitral stenosis, showing cyanosis, dyspnea and edema. This is easy to understand because organic heart diseases cause injury to the parenchyma of the other organs, particularly to the kidneys, and when the extra effort is thrown upon them the toxemia is the result. I saw one case of dilated heart, where pituitrin was used when the pressure was high. The heart became more dilated and the patient's condition became very precarious. Under these circumstances, particularly where there are toxic symptoms, venesection has impressed me as best, and if an operation is performed the loss of blood is often beneficial. I have seen several of Dr. Hussey's cases where he has done Cesarean section and several with less radical treatment and the results of the former have been very much better, not only in the lessened amount of strain upon the heart at the time of delivery but in a very much smoother puerperium. Usually these cases of labor with cardiac failure, even when carefully guarded by "Twilight Sleep" in the first stage and rapid delivery in the second stage, have a bad time of it for the first eight or ten days, hanging between life and death, and require careful watching. If these cases could have the proper care during the whole of the pregnancy, as Dr. Hussey suggests, the maternal mortality would be reduced to the vanishing point and the 50 per cent. mortality of the children greatly reduced.

DR. CORNWALL.—The question, what to do in pregnancy complicated by a heart lesion, is not always an easy one to answer, but we can only rely to a certain extent upon general principals. If there is a mitral stenosis, signs of loss of compensation, even slight, are of grave significance, and usually constitute an indication to terminate the pregnancy. If there is a history of previous loss of compensation in a patient with mitral stenosis who is pregnant but shows no signs of loss of compensation, the indication to terminate the pregnancy should, in my opinion be considered imperative. If a patient with mitral stenosis who gives no history of loss of compensation in the past become pregnant, she can be allowed to go on under strict observation and careful regulation of life and espe-

cially diet; but at the first sign of heart strain she should be delivered of the burden of gestation. That some patients with mitral stenosis can bear children with impunity, or seeming impunity, is evident from experience: I have certainly seen cases of mitral stenosis which gave a history of several pregnancies without loss of compensation. But in this serious heart condition it is always best if the case is at all doubtful, to let the judgment be influenced by considerations of safety. Of the other valvular lesions, mitral incompetence is the most common, and the least dangerous. Considerable leeway can be allowed a pregnant woman with this lesion when it shows signs of decompensation, but here every prophylactic measure should be observed and decompensation that shows signs of becoming intractable to treatment is an indication for terminating the pregnancy. Aortic valve lesions are usually very dangerous to the pregnant woman, though comparatively infrequent. The principles that obtain in mitral stenosis would seem to be applicable to them. Myocardial degeneration is sometimes a difficult condition to estimate in its relation to pregnancy, but fatty overgrowth may not necessarily be of much importance. In fact, pregnancy has been suggested as a method of training the muscle in this form of fatty heart. In the care of patients with any form of cardiac weakness regulation of the metabolic burden is of the first importance, and that, of course, is effected through the diet.

DR. BEACH.—I have been very much interested in the paper as I have recently taken a mitral stenosis case through pregnancy and labor, and it is the last time I will attempt it. This patient came to me when she was two months pregnant, and when I discovered the lesion I advised emptying the uterus, but she refused. I made every effort to carry the case through. We regulated her mode of life, especially in the matter of exercises, but by the time she was seven months pregnant she could hardly walk. In the last two weeks she could not get up and down stairs, and was short of breath even in going about her apartment. There was some cough and bloody expectoration. The heart was 16 cm. across, blood pressure about 130, no edema. We took her to the hospital a few days before the time of delivery and put her on tonics. When she went into labor she immediately had hard pains, was dyspneic, cyanotic, and nervous. I gave her morphine, one-quarter, and later some scopolamine and morphine, and then waited to determine what to do later. On examination I found five fingers' dilatation and the head almost at the outlet, and we let her proceed. We could tell absolutely the beginning of the second stage by her appearance for as soon as she began to have bearing-down pains she became cyanotic. We then discovered that the position was an occiput posterior and after giving ether I did a manual rotation and delivered, which was comparatively easy. Before the baby was out sand-bags were placed on the abdomen above the fundus, and the patient was placed in a partial sitting position. She collapsed immediately after delivery, the blood pressure dropped to 80 mm. She was given camphor and pituitrin, and placed in the Trendelenburg position. Two hours

later the blood pressure was 100 mm. and four or five hours later it was 120 mm. Later she complained of the pressure of the bags, as we had perhaps 50 pounds of sand on her. I took one bag off and inside of five minutes the blood pressure was down to 104 mm. We kept the sand on for forty-eight hours and then gradually reduced it, and at present she has only a tight binder. In regard to the nursing of the child, the internist said he did not see why she should not nurse the baby. She is only a slip of a girl and it is a question whether she should nurse or not. One point which Dr. Hussey did not bring out and that is spinal anesthesia. I have had five cases. I remember one case of Dr. Luria's in which I emptied the uterus under spinal anesthesia with a good recovery. At the Methodist Hospital Dr. Humpstone had a case which he treated by spinal anesthesia which made a good recovery. I believe the morphine and scopolamine method, followed by spinal anesthesia to be the ideal anesthesia in cases where the uterus is to be emptied by abdominal or vaginal Cesarean section.

DR. HUMPTSTONE.—I believe that cases of mitral insufficiency need not be considered unless there is a break in compensation during the pregnancy. My experience is that the internists do not see the patients in their homes very often, and we usually get a conservative opinion. I believe the determination of the labor must rest always with the obstetrician, not with the internist, who may tell us in what condition the heart is, but we must be the ones to decide. The woman with myocarditis shows very little toxic symptoms and goes along to the seventh month and then the heart dilates and she dies, and this is particularly seen in patients with fibroids. In the matter of delivering these cases, I want to say that what Dr. Beach states is my belief. I would rather use the spinal anesthesia in mitral stenosis with broken compensation.

DR. POLAK.—I feel as Dr. Humpstone does about the internist in many instances. We have come to look at these cases of broken compensation as serious problems. While I am not so radical as to believe that all of these cases should be aborted, I believe with Dr. Hussey that they should be observed with great care. There are three points to consider:

1. The woman with such a lesion who has had a child is not in as good condition (notwithstanding the statement of Dr. Cornwall), as the woman who has not had a child, for every childbirth is a strain upon the heart.

2. Early cases who have heart defects and who are pregnant and a break has occurred either before or during this period should be watched. We may carry them through to seven and one-half or to the eighth month, they should never be allowed to go to full term or to go through labor.

3. The class where we meet the trouble for the first time during the labor. I agree with Dr. Hussey that they do not bear the strain of labor well and such a case should be operative. We have found that it is extremely dangerous in any of these cases to attempt induction unless that induction is proceeded by complete amnesia. I do

not know of anything that disturbs the heart so much as apprehension and excitement, and I believe in the use of morphine and scopolamine. We have had a large number at the L. I. C. Hospital and have gotten good results by carrying them through with the aid of morphine and scopolamine. As soon as delivery through the vulva has commenced we have bled them and have begun to stimulate them with camphor and used pressure on the abdomen with large sand-bags. Those points are clear. These patients do not stand nitrous oxide well, but if well morphinized ether and oxygen and stimulation do the work. I do not believe in bleeding them from the uterus, most of the trouble from engorgement is on the right side of the heart. Section has been done on five cases and they have all resulted favorably for mother and child. The objection to section is that emptying the uterus suddenly produces shock. It is, however, less of a strain and with the proper use of sand-bags will bring them out with less shock. Dr. Hussey's conclusions should be brought to the attention of the general practitioner, who, as a rule, does not know what it means to have a heart lesion go through the strain of labor.

DR. HUSSEY.—I think Dr. Beach is right in saying he would not try to carry another case of mitral stenosis with broken compensation through labor. It would be safer to operate without the patient knowing anything about it, by putting her to sleep at night with morphine and operating in the morning. Anxiety and worry are almost as bad as physical strain in these cases. Morphine numbs the patient so that she does not worry. Spinal anesthesia is mentioned by several writers. I have had no experience with it myself. It would seem to me to be dangerous in some forms of heart disease as it is said to depress the circulation. Nitrous oxide alone is dangerous but with oxygen it is safe. I do not think one should take a radical position and abort all cases of mitral stenosis. The problem we have to study is based not on the particular heart lesion but on the condition of the patient, what is the heart reserve and its relation to the burden of this pregnancy and labor.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

(Continued from page 103.)

THE USE OF THE X-RAY IN UTERINE HEMORRHAGE.

DR. ROBERT T. FRANK, of New York City, said the x-ray treatment was indispensable in gynecology, but under strict indications and limitations. The rays worked mainly by destroying ripening ovarian follicles, primordial follicles showing great resistance. When no ripe follicles were present, menstruation ceased. In fibroids there might also be a first effect on the tumor.

Fractional exposure implied frequently repeated treatments of small amount. This took more time, but permitted of finely graded dosage. Intensive treatment by use of small multiple fields permitted of rapid attainment of amenorrhea.

The rays could be used in all functional hemorrhages (menorrhagia or metrorrhagia) in which expert examination revealed normal pelvic organs, and in which the curetings were free of malignant changes. This saved the uterus of adolescents and women in their sexual ripeness, because the bleeding could be "toned down." It also saved women in the preclimacteric age from operation, if they were bad operative risks.

He used the x-ray in about 5 per cent. of fibroids. Only 45 per cent. of fibroids required any treatment. Bleeding was most readily cured by raying. In order to permit of the safe employment of x-ray, he postulated that no cases should be rayed in which a suspicion of carcinoma or sarcoma could be entertained, that no complications, such as ovarian or adnexal tumors, were present; that no urgent symptoms were present. This limited the treatment to clear cases of uncomplicated fibromyoma. Preference should be given to the rays when extreme psychical unrest or severe cardiac, renal or pulmonary disease contraindicated operative measures. The expense entailed by raying precluded its use except in well-to-do patients or in endowed institutions.

PRECANCEROUS CHANGES IN THE UTERUS.

DR. WILLIAM S. STONE, of New York City, attempted under this title to express the evolutionary character of the different types of cancer of the uterus as beginning in definite benign lesions, such as erosions, leukoplakia and glandular hyperplasia, which showed variable quantities and qualities of epithelial overgrowth and metaplasia that might differ little from the regenerative activity seen in the benign lesions, or after a longer or shorter time might show atypical features that were differentiated with difficulty from the alterations we knew typified malignant neoplasms. To such pathological changes he thought the term precancerous might be appropriately applied, as they appeared to represent changes that were neither cancerous nor noncancerous, but were in the stage of becoming cancer. Their relation to the development of a cancerous growth was shown by the fact that their morphological features included, in different combinations of quantity and quality, the numerous histological criteria upon which the diagnosis of a fully established cancer was made, lacking only in some instances the features of destructive activity and purpose. The strongest support of that question was derived from the reproductions of types which were seen in the different stages of their progress. In his material, for example, he found the atypical features of a healing erosion determined by the original type of the lesion—simple, papillary, follicular and the atypical types again reproduced in the different types of fully established uterine cancer. There were atypical erosions which were prototypes of either an epidermoid cancer or a papillary

adenocarcinoma. There were leukoplakias which were prototypes of adult acanthomas. There were glandular hyperplasias which led to adenoma or adenocarcinoma. Finally, there were focal areas of leukoplakia, combined with adenomatous hyperplasia, which might well furnish an origin for tumors designated as adenoacanthomas. In short, for each type of fully developed carcinoma there was a corresponding type of benign and intermediary change.

The literature had been critically reviewed, showing increasing evidence confirmatory of the sequence of benign lesions in the uterus and cancer, but the efforts to define their histogenic relation had been limited to a few writers. In order to more fully verify the assumption that morphological features of intermediary stages existed, a close coöperation between the clinician and the pathologist would be required. For the present, it was no argument against such an assumption because no tumor process was present or followed in a given case. The evidence in the literature was already sufficient to show that a fully established cancer might exist for a certain time without giving gross evidence of its presence, and numerous cases were recorded in which the curet had completely removed the disease. There was no reason to assume that precancerous changes without treatment must always develop into malignant growths. Different types of fully established tumors had a different capacity to grow and destroy rapidly or slowly, and it did not seem reasonable to assume that a developing cancer had the same momentum that a fully established tumor possessed. In the study of beginning cancer of the uterus several authors had directed attention to the fact that a certain type of early cancer might spread superficially over a wide area before showing marked invasive features, and it had occurred to the author that such a mode of growth might account in some measure for the extent of the process before it received the attention of the clinician. With the description of the author's cases there were sufficient clinical data to show the practical side of the problem, that the decision regarding the proper therapeutic procedure in such cases should be assumed by a competent clinician.

THE CLINICAL COURSE OF CANCER IN THE LIGHT OF CANCER RESEARCH.

DR. HARVEY R. GAYLORD, of Buffalo, New York, Director of the State Institute for the Study of Malignant Disease, said cancer was not one disease but a group of diseases. The various types of sarcoma in chickens caused by filterable viruses had taught us that there were neoplasms with specific agents which determined the character of tumor. Progress required that cancer of different organs must be treated as individual diseases and studied individually. The study of immunity to inoculated cancer threw new light upon the clinical course of the disease. Successful surgery, x-ray and radium treatment were all dependent upon immunity. Early operation owed its success to the fact that immune reactions in spontaneous cancer were strongest in the early stages of the disease. The effect of chloroform and ether anesthesia and loss of blood dependent upon surgical operation was shown to exercise a destructive effect upon the immunity.

THE TREATMENT OF CANCER OF THE UTERUS.

DR. JOHN G. CLARK, of Philadelphia, Pennsylvania, said the treatment of cancer of the uterus might be classified under three divisions: (a) The radically operative; (b) the radical use of the cold cautery, and (c) the use of radium or mesothorium.

Statistics as to surgical results were now upon a definite basis and demonstrated a higher percentage of cures from the radical abdominal operation than ever achieved by the less radical vaginal and abdominal methods; in rebuttal might be offered the much higher primary mortality and the greater number of disabling sequelæ from the former over the latter. The dangers of the radical operation were great even in the hands of the expert and prohibitive when performed by the surgeon of limited experience. Many so-called radical operations were mere makeshifts, the patient being subjected to the greater hazards without any appreciable gain over the simpler methods by an attempt to execute an operation which fell lamentably short of an ideal standard.

As yet, the use of the cold cautery was in the proving ground and, as already demonstrated, was a procedure which to be successful must be radical and would, therefore, be attended with a high primary mortality as well as serious sequelæ. It must, therefore, show a higher percentage of ultimate cures to make it a worthy competitor of the radical operation.

In an experience of over two years, radium had given encouraging promises, first, as a palliative remedy, and, secondly, as a tentatively curative one. It was in no sense a miraculous panacea, for a very definite percentage of cases was not helped and the malignant process did not appear to be even halted but might actually be expedited. The sequelæ, however, following its judicious employment were comparatively insignificant as compared with the foregoing methods, and, therefore, if the patient was not helped she was at least spared the added miseries of unfortunate accidents.

Because radium was not a dependable agent in all cases, and because as yet the type of cancer which would be helped could not be forecasted, surgical measures must still be invoked, but might be supplemented by radiozation. The dictum of the last few years, "In case of doubt, extirpate the uterus," was now modified, for in all such instances we now applied radium. Thus far, in no instance had hysterectomy been performed when radium had acted beneficially, for it was not logical that an operation could accomplish anything further. As experience now pointed, it would appear that radioactive agents were to serve as an excellent supplementary remedy to surgery, offering better results in the operative cases and a definite hope to the inoperable.

THE EXTENDED OPERATION FOR CARCINOMA OF THE UTERUS.

DR. REUBEN PETERSON, of Ann Arbor, Michigan, presented the following summary and conclusions: 1. Further experience with

the radical abdominal operation for cancer of the uterus confirmed the belief that it was an exceedingly dangerous procedure and would always be attended by a high primary mortality. 2. Even if the percentage of operability of cases of cancer of the uterus markedly increased in this country and elsewhere, there would always be borderline cases attended by a high primary mortality. 3. This was true because it was not always possible, even with the greatest care in examination of the patient prior to operation, to estimate the extent of the disease. 4. Errors in judgment meant death from shock if the disease was too far advanced, or failure to complete the radical removal of the cancerous uterus. 5. However, in spite of a high primary mortality it was the only procedure, with the possible exception of the extended vaginal operation, which held out any reasonable promise of a permanent cure. 6. Primary and end results of the radical operation for cancer of the uterus must be considered together in order to judge of the good accomplished in a given series of cases. 7. Unless the operation could be radical the end results would be poor, and if they were radical the primary mortality must be high. 8. If the end results were poor the burden of proof was upon the radical abdominal operator to show why he did not choose a much safer palliative procedure. 9. Since 1912, experience with fourteen ordinary panhysterectomies for cancer of the fundus showed worse primary and end results than in eleven cases previously reported where radical removal was performed. 10. That showing and the results following removal of fundus carcinoma by various methods in the Wertheim Clinic as reported by Weibel, led to the conclusion, that, because carcinoma of the fundus was more easily cured than when the cervix was involved, we were not justified in thinking it could be treated any less radically than carcinoma of the cervix. 11. The primary mortality in fifty-nine cases of cancer of the cervix and fundus treated by the radical abdominal operation was 25.4 per cent. 12. The extent of the involvement in cancer of the uterus could be determined definitely only after the abdomen had been opened. If the parametria were not too much involved and the condition of the patient's kidneys, heart and blood-vessels warranted a prolonged and depressing operation, it was justifiable to attempt the radical operation. 13. During the past four years 124 cases of cancer of the uterus had been seen in the university and private clinics. The disease was so far advanced in thirty-six cases that operation was refused and nothing was done. The cautery method was tried in fifty-eight cases and proved valueless except as a palliative procedure. 14. In spite of attempts to educate the public regarding cancer, the cases of cancer of the uterus seen during the past four years were more advanced than had formerly been the case. 15. The end results in fifty-one patients operated upon five or more years ago were most gratifying. Combining fundus and cervix cases, twenty-seven of the fifty-one patients were alive and well after five years or 56.2 per cent. of all the cases operated upon, while 69.2 per cent. of all these surviving the operations were alive after five

years. 16. Of forty cases of cancer of the cervix operated upon five years or more ago eighteen of those surviving the operation were alive and well to-day. Thus 47.3 per cent. of the total number remained cured after five years, while 62 per cent. of those surviving the operation remained cured. 17. Those percentages were obtained by Wertheim's formula where patients dying of intercurrent disease or those lost track of were subtracted from the total number of operative cases or from the number surviving. 18. The length of time elapsed since the operations upon the eighteen patients who were alive and well varied from five up to thirteen years. There was every reason to think these patients were permanently cured, although one patient did have a recurrence and died between five and six years after the radical operation. 19. In spite of the high primary mortality, the end results in those surviving the operation encouraged us to continue with the procedure in suitable cases.

A RÉSUMÉ OF RESULTS IN THE RADIUM TREATMENT OF THREE
HUNDRED AND FORTY-SEVEN CASES OF CANCER OF THE
UTERUS AND VAGINA.

DR. HOWARD A. KELLY and DR. G. F. BURNAM, of Baltimore, Maryland, after seven years' experience and with a full knowledge of similar work in other parts of the world could now say without hesitation that the use of radium in sufficient quantities greatly enhanced the chance of permanent recovery of patients with uterine and vaginal cancers.

In early and good operable cases the use of radium combined with operation added greatly to the chance of recovery without a recurrence. This was shown in a series of twenty such cases in which they had as yet seen no recurrence. The most remarkable fact about the radium treatment of uterine and vaginal cancers was that it often cleared up those cases which had extended too far locally and became firmly fixed to the pelvic wall; in other words, cases which were utterly inoperable.

They had had 327 patients, including border-line cases, cancer fixed to the pelvic wall, great massive cancers choking the pelvis, and many where there were general metastases and the radium was used to bring relief alone. Over 20 per cent. of this remarkable group had been apparently cured.

They did not pause here to dwell upon the great alleviation afforded a large number of those who were not cured, but where discharges stopped, pain ceased, and health was built up.

Their conclusion then was that radium had come to stay and was the most efficient agent in treating these forms of cancer.

THE PROBLEM OF HEAT AS A METHOD OF TREATMENT IN INOPERABLE
UTERINE CARCINOMA.

DR. J. F. PERCY, of Galesburg, Illinois, said there were three stages to be recognized in the development of the cautery in the

treatment of carcinoma of the uterus; first, where it was merely used to stop hemorrhage and limit offensive discharge. Second, the galvanocautery excision of the cervix uteri, developed by the late Dr. John Byrne, of Brooklyn, N. Y. In this technic a high degree of heat was used sufficient to cut the tissues. Third, in the dissemination of a coagulating degree of heat through the widest area possible of the cancer mass, with no attempt at immediate excision of the parts (Percy).

The technic of Byrne was not designed for the advanced inoperable cancer patient, the one in which the uterocervical junction was fixed, with extensive malignant and inflammatory infiltration of both broad ligaments and the parametrium. As classified to-day, Byrne operated only in the first steps of cervical cancer involvement. He deplored the use of the cold steel knife in cervical cancer and forty-four years ago referred to it as "a comparatively fruitless procedure at best." This was just as true to-day, without the preliminary use of heat, as it was in his day. The cases treated by Byrne with his galvanocautery excision of the cervix were the type of cases, a large proportion of which would be considered by surgeons qualified to do it, suitable for the Ries-Wertheim treatment of to-day.

Percy's technic brought us back to the days before Byrne, to the treatment of the otherwise hopeless case, and in addition he stated that his technic opened up new possibilities in the way of further improved results. The author hinted at something not mentioned in his paper in the following: The stage of operability with his present technic was easily 90 per cent., and he confidently expected that, if the promise which he saw in his work was realized in the further development of the use of heat in cancer, the stage of operability would be without limit in strictly pelvic cancer. He would not have us believe, however, that the ideal was mere operability. Back of it all was the hope and promise of results never before obtained by any method so far developed in that disease which had always stood as a synonym for incurableness—pelvic cancer.

In conclusion, the author re-emphasized first that the Percy technic, so called was not a cautery operation. He removed nothing. The tissues, following the application of the moderately low degrees of heat, were literally coagulated and slowly dissolved.

It usually took two weeks for a healthy granulating surface to appear beneath the gradually dissolving mass of inert cancer debris. Second, the operation of Byrne was a high galvanocautery incision of the cervix. There could be but little penetration of heat. Byrne recognized this when he advised that the surface left after the removal of the gross mass be seared over with the cautery knife, in order to get all the heat penetration possible. But Byrne never thought of applying heat to the degree of obtaining penetration sufficient to render movable the fixed tissues in the pelvic basin. If the fixed tissues, malignant and inflammatory, were not made freely movable, as they were normally, the heat penetration was not sufficient, and, therefore, was ineffective. Third, to coagulate a large

mass of uterine cancer required from thirty to sixty minutes, and if the broad ligaments still remained stiff, or fixed, an additional ten minutes. Fourth, in his effort to emphasize the importance of avoiding the burning temperatures, he feared that he had led many surgeons to the opposite extreme, and that they were trying to destroy the activity of an inoperable mass of cancer with a temperature so low that days, rather than hours, would be required to make the heat effective. Byrne fried his tissues, while Percy broiled or Pasteurized them. The Byrne technic was based on the use of heat as an acute process; that of Percy was not acute, but chronic, both as to time and degree. Heat, more heat, and yet more heat; but heat; not fire; broiling, not frying; not roasting, but curdling; Pasteurization, not desiccation; coagulation, not carbonization.

In its practical application the whole technic could be summed up in the one statement; "do not carbonize the tissues, for in the degree that this is done, in that degree is heat penetration inhibited; and heat penetration is the vitally essential thing." A gentle simmering sound only should be heard when the ear was placed near the vaginal water-cooled speculum. This simmering sound was produced by a temperature above 45° C. (113° F.). Heat in cancer, operable or inoperable, or as a preliminary to the use of the cold steel knife, had with its present development, come to stay. It offered more, in the way of cure, in the early case, than any other treatment so far devised. In the late case it promised surcease from suffering, with a prolongation of life that was most hopeful.

But more than all else, we had not yet fully learned the technic of most effectively destroying cancer of the accessible regions of the body by heat. When we did, another chapter would be written in the history of man's contest with his physical ills that would compare very favorably with anything so far accomplished along the lines of scientific endeavor.

HIGH HEAT VERSUS LOW HEAT IN THE TREATMENT OF CANCER OF THE UTERUS.

DR. HERMAN J. BOLDT, of New York City, said that he had expressed himself fully on the relative value of high degrees of heat compared with low degrees of heat as a palliative therapeutic agent in the advanced stages of cancer of the uterus, in an article published in the *AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN*, for January, 1916, and judging from the communications that he had received from physicians who had had experience with the treatment, his position was amply justified. It was also corroborated by another autopsy, in addition to the one that he had, by Dr. F. W. Bancroft, of New York.

He did not wish to be understood as detracting from the usefulness of low heat, but it should be reserved principally for a second application, after rapid destruction had been accomplished with high heat, and the charred eschar that was caused by the high heat had been thrown off; and for those cases in which the cancer had so far

advanced that the proper application of high heat would endanger the bladder or rectum. The danger from secondary hemorrhage was not less with low heat than with high heat. No evidence had been presented that showed the superiority of one method over the other.

Heat, properly used and applied in correctly selected cases, sometimes gave remarkably good palliative effects. But it had been conclusively shown that cancer cells were not destroyed any appreciable distance from the surface of application, certainly not deeper with low heat than with high heat. This was proved by the examination of tissues procured at the autopsies mentioned.

DR. CHARLES MAYO, when discussing the paper alluded to, published in the AMERICAN JOURNAL OF OBSTETRICS, asserted that the proof of the deep destruction of low heat as shown in cases that had been operated upon in the Mayo Clinic, lay in the fact that at the time of cauterization the disease had too far advanced for the patients to be operated upon radically, but later the uterus became mobile and was extirpated, and when these uteri were examined by the pathologist, he failed to find any evidence of malignant disease in them. This hypothesis was not acceptable to Dr. Boldt as valid proof, since the mobility might have become impeded by an inflammatory process, which, as the result of the heat treatment, became dried out, as it were, and mobility of the uterus resulted; a result seen also when high heat was used. The inflammatory infiltration might subside, but the carcinomatous infiltration remained. To disprove this it was necessary for the operator, when the abdomen had been opened, to remove a part of the suspicious infiltrated area in the pelvis a reasonable distance away from the cervix, and have it examined by a competent pathologist. If that showed cancer nests, and the uterus became mobile subsequently, so that a radical operation might be done, and the specimen then removed by a radical operation failed to show cancer elements in the parametria, we were in a position to grant the deep destruction of cancer elements by the heat applied, but not until such proof had been shown.

Attention was called to those instances in which recovery followed when a simple extirpation of the uterus had been done, despite some parametrial infiltration, and in which, after a period of a few months, a re-examination failed to show any evidence of infiltration. He recalled two such cases.

ABDOMINAL MYOMECTOMY AND HYSTEROMYOMECTOMY BY MORCELLATION.

DR. CHARLES G. CHILD, JR., of New York City, stated that in the surgical treatment of the fibroid uterus the multiplicity of the tumors and the large size of the tumor mass often added very materially to the difficulty of removal. "The larger the tumor the larger the incision," was the time-honored dictum. He believed that these operations might be greatly facilitated by decreasing the bulk of the tumor mass as the removal proceeded, and that this method of removal meant greater safety to the patient.

As the size of the tumor decreased with its removal, a large incision was unnecessary. He, therefore, employed the transverse suprapubic incision, 3 to 5 inches in length. The transverse incision was the one of election for three important reasons: First, because it gave a maximum exposure of the field of operation with a minimum exposure of the abdominal viscera; the intestines lay well protected by the upper flap; second, because of the freedom from postoperative hernia; and third, because it yielded a higher percentage of primary union than did the median line incision.

The author described the method of making and closing the incision.

He presented a series of fifty cases from his records, with a brief analysis of some of their most salient points. These were consecutive and not selected cases, and while the number was comparatively small, yet he felt that the series covered pretty well the field of fibroid pathology and gave a very good idea of the value of this technic.

Chronic adnexal disease was encountered in 22 per cent. of the cases: adherent appendix, 19 cases; retrodisplacement, 2 cases; intra-ligamentous cyst, 2 cases; fibroids, twisted pedicle, 2 cases; acute inflammation, 1 case; calcareous degeneration, 3 cases; necrosis, 4 cases, and early pregnancy, 1 case.

Myomectomy was performed nine times and hysterectomy forty-one times.

The author drew the following conclusions. The advantages of myomectomy or hysteromyomectomy by morcellation were many. The original morcellation by the vaginal route enjoyed great popularity because of the smoothness of the subsequent convalescence and freedom from postoperative complications, both immediate and remote. The abdominal removal of these tumors by morcellation now that we had to-day so improved our abdominal technic gave just as smooth a convalescence and just as great a freedom from complications as was secured by the vaginal operators in the past.

The advantages of the technic which he outlined might be considered both from the point of view of the patient and of the surgeon. To the patient it afforded greater safety, a shorter and a smoother convalescence. This was by reason of the fact that as the surgeon worked practically extraperitoneally the intestines were kept out of the way without resource to laparotomy pads, thus was the intra-peritoneal traumatism minimized and postoperative shock, distention or peritonitis was seldom, if ever, seen. In hysteromyomectomy the danger of secondary hemorrhage from slipped ligatures on the broad ligaments was very materially decreased because of the ease with which the relaxed broad ligaments could be ligated. The smaller incision and the stronger resulting scar, especially when the transverse incision was used, reduced to a minimum the danger of hernia. The high percentage of primary union resulting when the transverse incision, was closed with noninfectable suture material, meant a much shorter hospital residence. A large granulating median line incision, where primary union had not been secured,

meant a prolongation of the convalescence by many weeks, with a good prospect of a subsequent hospital stay when the ventral hernia, almost certain to occur in such a case, was operated upon.

Relative to the advantages to the surgeon, during the greater part of the operation the tumor was in contact with the abdominal wall, and the work was extraperitoneal. Thus was the surgeon able to see definitely each pathological condition as it arose, and to take the necessary time to meet the indication, for by this technic the length of time which the patient was under the anesthetic was not nearly of the importance that it was when a large median line incision had been made with all the consequent exposure of intestines, and the use of laparotomy pads that went with the older technic. In hysteromyomectomy the ease with which the broad ligaments could be ligated, and the cervix removed when a complete hysterectomy was necessary, was very marked. Although the transverse suprapubic incision might be so small as to handicap many an operator at the start, still as skill in anything was acquired only by repetition, so here with experience one became quickly proficient.

A STUDY OF THE PATHOLOGY IN ITS RELATION TO THE ETIOLOGY WITH THE END RESULTS OF TREATMENT OF STERILITY.

DR. JOHN OSBORN POLAK, of Brooklyn, New York, defined sterility as the inability on the part of a woman to produce a living child. In this study, which was a personal review of 788 case histories of patients from the writer's private experience, he attempted first to analyze the many etiological factors which had entered into the causation of this symptom; second, to discuss the treatment of the individual case based upon an etiological diagnosis, and finally summarize the end results, with the hope that the paper might add something to the already overwritten but unsolved subject.

The passage of the spermatozoon through the cervix was dependent upon the activity of the particular spermatozoon and the amount, character and reaction of the glandular secretion from the cervix. Acids in very weak dilutions were destructive to the spermatozoa and thick mucopus acted as an almost insurmountable barrier to the progress of the male element.

The proper transit of the ovum from the ovary to the uterus required a healthy patent Fallopian tube.

The conditions of the tube which might impair the transmission of the impregnated ovum were either congenital or acquired. On arriving in the uterus, the impregnated ovum located in the decidual bed prepared for its nourishment, which was usually situated just below the uterine ostium of the tube on the anterior or posterior wall of the uterus, and unless the endometrium had been the seat of disease the ovum developed at the site of its primary implantation.

In managing the cases of sterility, he began with a thorough investigation of the life and functions of both contracting parties.

The reaction of the vaginal and cervical secretions was thoroughly investigated and the presence of gross pathology in the fornices

noticed. A Wassermann test was made in all of those who presented themselves with histories of abortions or premature labors with or without death of the fetus.

The treatment in all cases was directed toward the correction of the existing causative lesion. In the first class, this included the employment of alkaline douches, of the graduated dilators, the Baldwin or Davenport stem, discission of the cervix, after the methods of Dudley or Pozzi, amputation of the cervix and correction of uterine displacements.

In the second class both local and operative measures were employed. In ten cases of large ovarian cyst, unilateral oöphorectomy resulted in eight of the women becoming pregnant. Of twenty uncomplicated retroversions, eleven were repositable and could be maintained in position with a pessary. Six of these women became pregnant. Nine because of a deep posterior invagination of the cervix could not be held in place with a support. These were operated by the Webster-Baldy or Gilliam technic and a Dudley discission. Of these, five became pregnant.

Infravaginal hypertrophy of the portio had given not only the best surgical cures, but amputation of the hypertrophied portion of the cervix had been followed by pregnancy, the women going to full term in each of five cases.

In the second class made up of 183 women presenting some evidence of the results of an infective process, postpartal, postabortal, or gonococcic in origin, pregnancy had been relatively frequent. Of the 104 women subjects of endocervicitis with a mucopurulent discharge, only twenty-one became pregnant. Eight conceived as a result of one local treatment in which the mucus plug was removed with a bicarbonate paste, and the canal swabbed with iodized phenol. Three became pregnant promptly after the glands were destroyed with the cautery, and ten following the persistent use of the carbonate of soda douche.

Of the ninety cases which were found to have results of infective processes in the tubes, uterosacral ligaments, and cervical canal, the intrauterine and tubal pregnancies were equally divided, there being three of each. The abdomen was opened in all of these patients because of the history, and not because of the gross pelvic findings. There was invariably present a history of infection, with sterility, dyspareunia and local discharge. Tubal ablations were done thirty-five times, resections thirty-one times, and freeing of adhesions in thirty. Two ectopics occurred in resected tubes, against three intrauterine pregnancies. One ectopic occurred in a freed tube, but no uterine pregnancy. Of the fifty-four fibroids, myomectomy was done in twenty and hysterectomy in thirty-four. Six pregnancies occurred following myomectomy, four going to term. Following the ten unilateral oöphorectomies for large ovarian cysts, eight women became pregnant.

One hundred and thirty-two uterine, and three ectopics, were the sum total of pregnancies occurring in 358 women in whom conception was a probability, or 37 per cent.

The study showed first, that a very large number of the sterility cases applying for relief, had no chance whatever of becoming pregnant, for the reason that the pathology was such as to make conception impossible. Second, that the male was largely responsible for the poor results in treatment. Third, that there was a definite chemicophysiologic factor in conception, at present unexplainable, which was a cause of preventing conception. Fourth, that operative procedures on the uterus, except amputation of the hypertrophied portio, had but a slight influence on the end results in the treatment of sterility, and, finally, that each case must be individualized and both contracting parties carefully studied before any treatment was inaugurated.

THE CONSTITUTIONAL FACTOR IN GYNECOLOGY AND OBSTETRICS.

DR. CHARLES P. NOBLE, of Philadelphia, read a paper with this title in which he presented the following conclusions: 1. The theory of environmental, constitutional hypoplasia or arrested development from unfavorable environment, operating at any period from the preconceptional state of dual life in the ovary and testis, to that of the youthful period in ontogeny, which was presented to the profession as a medical hypothesis, in 1908, and which the writer believed to be proven upon human clinical and pathological evidence, was now shown to be equally supported by the clinical and pathological facts of antenatal pathology, and by the facts of comparative pathology; and to be demonstrated by the facts of experimental teratology. 2. The wisdom of the fathers of medicine, as expressed in their discriminating analysis of the facts of the hereditary nature of the diatheses or dyscrasias, together with the theory of environmental hypoplasia, constituted the law of devolution in its relation to medicine. 3. In order to obtain a comprehensive understanding of the practice of medicine, it was necessary to reject such of the teachings of Virchow and of his followers as were fallacious, and to combine the clinical wisdom of the fathers of medicine, from Hippocrates down, with the known facts of experimental medicine, and their correct interpretation, and thus to arrive at the true point of view from which to study and to deal with the clinical problems, which were the concern of practitioners of medicine, and of each of its specialties. 4. The constitutional factor in gynecology and obstetrics, as was equally true of the other departments of medicine, was the chief element in the clinical problems which confronted the practitioner, in dealing with disease, and with atypical organs and tissues and their functions. 5. The recognition, comprehension, and employment of the foregoing principles would greatly enlarge the powers of the practitioner of medicine in diagnosis, prognosis, and in therapy, enabling him to avoid many common, if not habitual, errors, and positively to substitute generally nutritional and developmental measures for the local measures currently employed, and thus to effect a cure, instead of the amelioration, of his patients' condition, when due to

environmental arrest. Furthermore, it would enable him to give scientifically based advice as to methods of living, when the biological type of the patient was recognized; to promote the development of environmentally arrested patients, and to enable them to maintain their health, by living within their particular potential or capacity to produce energy, instead of attempting to live as was physiological for typical individuals, but which would cause disease in the arrested or hereditary and environmental devolutes. 6. There remained, unsolved, two questions: 1. The process of mechanism whereby atypical morphology and function of environmental origin in ascendants became, at least, hereditary in descendants. Apparently, its solution would be found in the facts of the maleficent consequences of urbanization in human stocks, which escaped extermination by degeneration and disease, and the variations or adjustments which ensued, whereby acquired immunity was attained; and similar facts concerning the consequences of the long continuance, over generations, of other unfavorable environment, such as insufficient nourishment, malaria, the hookwork, and food deprived of some element necessary to nutrition, or so mistreated as to be relatively poisonous. It might become demonstrated by subjecting short-lived animals to definite, unfavorable environment, for twenty or more generations, and observing and correlating the facts thus obtained. Facts from biology as to species of animals and plants subjected for generations to inimicable environment, would also aid in the solution. 2. The eradication of degeneracy and its prevention would probably find its solution in the development of eugenics, and in the segregation, or the sterilization of individuals manifesting the more marked degrees of degeneracy, more especially of the hereditary types.

IMMEDIATE COMPLETE AMPUTATION OF THE UMBILICAL CORD.

DR. ROBERT L. DICKINSON, of Brooklyn, New York, said the only operation done on every human being should have principles of modern surgery and primary union applied to it. These were the avoidance of mass ligature, of slough, of closing the hernial opening by granulation scar, of amputation above the known line of demarcation, of choosing a sloughing process instead of a swift aseptic healing. One should bury the fine suture ligature about the base of the skin cuff; draw up the cord, amputate with one clip of the scissors through the upper margin of the skin; tie, inrolling.

(To be continued.)

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

The Influence of Pituitary Feeding upon Growth and Sexual Development.—Goetsch (*Bull. Johns Hopkins Hospital*, February, 1916) presents the results of an experimental study with the dried

powdered extract of the pituitary gland and the corpus luteum, which was fed to young rats. The sex glands were subsequently examined and observations also made upon growth, weight, development and breeding. It was found that when fed in doses of 0.1 gram daily no gain in weight resulted, the appetite was lost, peristalsis was increased and certain nervous manifestations take place, including muscular tremors and weakness in the hind limbs. The latter symptoms were believed to be due to the posterior-lobe element in the pituitary gland extract for they were similarly produced by using posterior-lobe but not by using anterior-lobe extract. When the whole gland is fed for a period of from twenty-five to forty days it causes a more rapid growth and development than in the control animals or in cases where the corpus luteum extract and equivalent dosage was employed. The ovaries, tubes, and uteri of the animals were larger, more vascular and edematous, and the ovary was found matured from one to two months before normal sexual maturity, showing active ovulation and Graafian-follicle formation. A similar precocious development was noted in the male sex glands. The feeding of pituitary anterior-lobe extract caused increased weight and more vigorous body growth than in the control and there is a similar earlier and more active genital development. The extract of the pituitary posterior lobe, even with prolonged administration does not have any stimulating effect on growth or the development of the sex glands and if given in too large doses cause loss of weight, increased peristalsis and enteritis. Corpus luteum extract when fed to the male causes a tendency toward the deposition of fat, but when fed to the female rat was found to be equally as stimulating as the whole pituitary gland, but not so stimulating as the equivalent weights of anterior lobe. This extract has a stimulating influence upon the female sexual development, however, which is manifested by increased development and activity of the sex glands and increased vascular formation. The author believes that benefit may be obtained in cases of lessened function of the ductless glands by the oral or hypodermic administration of these extracts. It is also possible that conditions of over activity of one of the ductless glands could be treated with extracts of another of the endocrine series possessing an opposing and inhibiting action.

Nitrogen Metabolism during Pregnancy.—K. M. Wilson's (*Bull. Johns Hopk. Hosp.*, 1916, xxvii, 121) observations on the nitrogen metabolism were made in three normal pregnancies: in one patient for a period of four weeks, from the tenth to the fourteenth weeks of the pregnancy. The other two patients were studied for the last 133 and 101 days of their respective pregnancies and also for a short time in the puerperal period. He finds that in the perfectly normal pregnant woman, storage of nitrogen begins at a much earlier period than has hitherto been supposed; possibly the organism may acquire the capacity for storing nitrogen from the very beginning of the pregnancy. In the early months this storage is far in excess of the actual needs of the developing ovum, and the excess must be added to the general maternal organism. Storage of

nitrogen continues throughout the entire duration of pregnancy, being most marked during the last few weeks, when the fetal needs are at a maximum. The nitrogen stored is greatly in excess of the actual needs of the developing ovum, so that, apart from the amount needed for the hypertrophy and development of the genitalia and breasts, a large proportion of the nitrogen stored is added to the general maternal organism as "Restmaterial," though, concerning the form in which this reserve is stored, we are unable to make any positive statement. The nitrogen capital of the maternal organism is thus increased, though the reserve supply may possibly be entirely exhausted during the puerperium and period of lactation. In the healthy woman, who goes through a normal pregnancy, the period of gestation does not necessarily represent a "sacrifice of the individual for the sake of the species," but may actually be a period of gain. There is a relative increase in the percentage of urinary nitrogen excreted in the form of free amino-acids, though not necessarily an absolute increase in this form of nitrogen. There is also a tendency for the percentage of ammonia nitrogen to become increased during the last weeks of pregnancy, although at other times during the pregnancy there is practically no variation from the percentages noted in nonpregnant individuals upon a similar diet.

Duration of Nursing Period in Women of the United States.—Analyzing the statements of 2819 mothers in the records of the Children's Hospital, Philadelphia for the last fifteen years, A. G. Mitchell (*Jour. A. M. A.*, 1916, lxvi, 1690) finds that in the poorer class of city women there has been no decline in breast feeding in the last fifteen years. The women of the poorer class compare favorably in the period of lactation with the women of the more prosperous class in this country. The women of this country compare favorably in the period of lactation with European women. The average period of lactation in children entered at the hospital was six months. Twenty per cent. of the women did not nurse their children; 80 per cent. nursed one week or longer; 55 per cent. nursed three months or longer; 42 per cent. nursed six months or longer; 34 per cent. nursed nine months or longer; 27 per cent. nursed a year or longer, 9 per cent. nursed eighteen months or longer, and 2 per cent. nursed two years. On account of the greater susceptibility of artificially fed babies to gastrointestinal and nutritional disturbance, the infants brought to the hospital were, in the large majority of cases, bottle fed at the time of their entrance there. The conclusion is inevitable that the figures given represent the minimum of lactation.

GYNECOLOGY AND ABDOMINAL SURGERY.

Bacteriology and Experimental Production of Ovaritis.—E. C. Rosenow and C. H. Davis (*Jour. A. M. A.*, 1916, lxvi, 1175) record the results of cultures made from tissues and the cystic fluid in a series of ovaries removed at operation, cite a few illustrative cases,

and give the results of animal experiments made with some of the strains isolated. The following facts support the view that streptococci isolated from the chronic lesions when there was no history of a previous acute infection, as well as those causing acute infections of the ovary, are carried to these structures by the blood more often than is generally believed:

1. The occurrence of fibrocystic degeneration of the ovaries in which the usual streptococcus was isolated in pure form in young women with imperforate vagina.
2. The history of tonsillitis followed by symptoms of pelvic infection in a number of patients in series.
3. The not uncommon occurrence of pelvic infection following angular attacks during the menstrual period.
4. The far more frequent occurrence of so-called idiopathic streptococcal peritonitis following angular attacks, in the female than the male, which, according to Wilder, is due to the occurrence of a primary hematogenous ovaritis and a secondary peritonitis.
5. The absence of colon bacilli in all but three ovaries in series, a fact contrary to expectations if local invasion occurred commonly.
6. The frequent concurrence of appendicitis, cholecystitis and arthritis in these patients, diseases proved to be due usually to streptococci from a distant focus of infection.

The writers have isolated streptococci, often in pure culture, and demonstrated them in the tissues in the areas showing infiltration, roughly in proportion to the amount of tissue reaction in a large proportion of the ovaries studied. Two of the strains isolated showed a marked affinity for the ovary in two species of animals (rabbit and dog) producing hemorrhage and leukocytic infiltration (precursors of sclerotic changes) in and surrounding the Graafian follicles and in the ovarian tissue stroma containing interstitial cells in the fully developed corpus luteum in a pregnant rabbit. Hence, the conclusion seems warranted that fibrocystic degeneration of the ovary even in the absence of previous acute infection is due commonly to a low-grade hematogenous infection by streptococci having elective affinity for these structures. Owing to the fact, however, that the number of bacteria found is relatively small and that the experimental lesions in the ovary are not due to an overwhelming growth, it is clear that while excision and resection of ovaries is indicated in some instances, it should no longer be done without due regard to the existence of chronic foci of infection which may serve not only as the place of entrance but also as the place for the bacteria to acquire the peculiar properties necessary to infect the ovary. Eradication of primary foci of infection might in some instances prevent premature sclerotic degeneration of the ovary.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

Special Meeting on Infantile Paralysis held July 13, 1916.

The President, WALTER B. JAMES, M. D., in the Chair.

This meeting was held in Aeolian Hall as the Academy of Medicine could not accommodate the large number of attendance.

WHAT WE KNOW ABOUT THE TRANSMISSION OF INFANTILE PARALYSIS.

DR. SIMON FLEXNER.—Infantile paralysis is caused by the invasion of the central nervous system by a minute, filterable micro-organism which is now secured in artificial culture and as such is distinctly visible under a high-powered microscope. The virus of infantile paralysis exists constantly in the central nervous organs and upon the mucous membrane of the nose and throat and in the intestine of persons suffering from the disease. Less frequently it occurs in the other internal organs and it has as yet not been discovered in the circulating blood of patients.

The employment of ordinary bacteriological tests have proved futile because of the difficulties attending the artificial cultivation and identification of the microorganism. However, the virus can be detected by inoculation tests upon monkeys, which animals develop a disease corresponding to infantile paralysis in human beings. Thus it has been shown that the mucous membrane of the nose and throat of healthy persons who have been in intimate contact with acute cases of the disease may become contaminated, and that such persons may, without becoming ill themselves, convey the infection to others, chiefly children, who develop the disease.

The virus has an apparently identical distribution irrespective of type or severity. We know that the virus leaves the infected human body in the secretions of the nose, throat, and intestines, and also escapes from healthy contaminated persons in the secretions of the nose and throat. Entrance of the virus usually occurs by way of the nose and throat. Multiplication of the virus then occurs, after which it penetrates to the brain and spinal cord by way of the lymphatic channels connecting the upper nasal membrane with the

interior of the skull. Whether the virus enters the body in any other way is unknown. The virus, thrown off from the body mingled with the secretions, withstands the highest summer temperatures for a long time, complete drying, and even the action of weak chemicals, such as glycerin and carbolic acid. Mere drying of the secretion, therefore, affords no protection. The possibility of converting the dried secretions into dust which can be easily breathed into the nose and throat, makes drying a potential source of infection. Weak daylight and darkness favor the survival of the virus, while bright daylight and sunshine hinders its growth.

Since epidemics of infantile paralysis arise during the summer months, the blood-sucking insects have been suspected of conveying the disease. Experiments indicate that the biting stable fly can withdraw the virus from the blood of the infected monkeys and reconvey it to the blood of healthy ones. More recent experiments have failed to confirm this. The ordinary fly may become contaminated with the virus contained in the secretions of the body and serve as the agent of its transportation to persons and to food with which it may come into contact. Domestic flies experimentally contaminated with the virus remained infected for forty-eight hours or longer. While our present knowledge excludes insects from being active agents in the dissemination of infantile paralysis, yet they fall under suspicion as being the potential mechanical carriers of the virus of that disease.

Poultry, pigs, cats and dogs have especially come under suspicion as possibly distributing the germs. Experiments, however, have proven these animals are not carriers of the disease.

Studies carried out in countries in which infantile paralysis has been epidemic all indicate that in extending from point to point, the route taken is that of ordinary travel. This is equally true whether the route is by water or land. This confirms the evidence elsewhere obtained that human beings and their activities are the chief distributing agencies.

The virus of infantile paralysis is destroyed more quickly in the interior of the body than, in some cases, in the mucous membrane of the nose and throat. It has been found that in monkeys the virus might disappear from the brain and spinal cord within a few days to three weeks after the appearance of the paralysis, while at the same time it is present on the mucous membrane mentioned. Six months is the longest period after inoculation in which the virus has been detected in the mucous membrane of the nose and throat of the monkey. In an instance of the human disease, the virus was detected in the mucous membrane of the throat five months after its acute onset. This is conclusive evidence of the occurrence of occasional chronic carriers of the virus of infantile paralysis.

Great variations or fluctuations are known to occur not only in the number of the cases, but in the intensity of the disease. The extremes are represented by the occasional instances of infantile paralysis known in every considerable community and the instances in which in a few days or a few weeks the number of cases leaps into

the hundreds, and the death rate reaches 20 per cent. or more of those attacked. Not all children and relatively few adults are susceptible to the disease. Young children are more susceptible, generally speaking, than older ones, but no age can be said to be absolutely insusceptible.

The period of incubation is subject to wide variations. In some cases it has been as short as two days, and in others as long as two weeks or even longer. The usual period does not exceed eight days. The period at which the danger of communication is probably greatest is during the very early and acute stage of the disease. This statement is made tentatively, since it is made from inference, rather than from demonstration.

One attack of infantile paralysis confers immunity. Passive immunity has been conferred on monkeys, but its effect is uncertain, and its brief duration renders it ineffective for protective immunization. Yet some success has been achieved in the experimental serum treatment of inoculated monkeys. Blood serum from recovered or protected monkeys or human beings, has been injected into the membranes about the spinal cord, and the virus inoculated into the brain. The injection of the serum must be repeated several times. The results of this treatment are said to be promising. The monkey alone seems capable of yielding an immune serum, but the monkey is not a practical animal from which to obtain supplies.

From our present knowledge, certain practical deductions may be drawn. Since human beings are the chief mode of conveying the virus, and since the domestic fly may be grossly contaminated with the virus and might deposit it on the nose and mouth of a healthy person, or upon food, our efforts should be directed against these sources of infection. The discovery and isolation of all those ill with the disease and the sanitary control of those who have been associated with the ill would best protect the public. Children infected should be removed to a hospital. In the event of doubtful diagnosis, the aid of the laboratory is to be sought since even in the mildest cases changes will be detected in the cerebrospinal fluid removed by lumbar puncture. If the effort is to be made to control the disease by isolation and segregation of the ill, then these means must be made as inclusive as possible. It is obvious that in certain homes isolation can be carried out as effectively as in hospitals. It is now too early to calculate the death rate of the present epidemic, but it may prove much lower than it now appears to be. Our knowledge of the disease is much greater now than in 1908, and the forces in the city now dealing with the epidemic are better organized than ever. The outlook should not be regarded as discouraging.

THE CLINICAL TYPES OF THE DISEASE.

DR. HENRY KOPLIK.—Poliomyelitis is primarily an epidemic disease; as a sporadic condition it has attracted very little notice. All the epidemics which have thus far been recorded resemble each other very closely. An attempt to connect this disease with the

occurrence of cerebrospinal meningitis has developed into a belief that poliomyelitis is an entity, clinically occurring in epidemics in the late spring to late autumn and following the regular sporadic occurrence of the disease in limited numbers in the months following the winter and reaching into the late spring up to the time of the epidemic outbreaks. Epidemics of this disease have been known to skip a year and to always crop up in the place of its original occurrence which should give the thoughtful a hint as to its possible cause and epidemiology. In all the epidemics thus far recorded, the symptomatology and clinical types have been much the same. Though most of the scientific knowledge of the clinical types of poliomyelitis is borrowed from Swedish and Norwegian observers, Medin and Wickman, the first inkling of the epidemic nature of the disease was voiced by Colmer, an American physician, who in 1841 observed some form of paralysis in a child and obtained the history that in the locality in which the patient lived several similar cases had occurred and most of them had recovered. Following him, Caverly in 1894 described an epidemic in Vermont; Taylor and Chapin later on observed the epidemic nature of the disease. Aside from these observers, much of the clinical knowledge at present is due to Medin who described the clinical types of acute epidemic poliomyelitis in 1884 before the International Congress, much to the astonishment of most pediatricians who still retained the simple picture as retained in older text-books, of poliomyelitis anterior as a simple, infantile paralysis. In all, forty-two epidemics have been observed in America and on the Continent and this alone should establish the tendency of poliomyelitis to occur in epidemic form at certain seasons and remain sporadic until the time arrives for a new outbreak. The disease selects the young as its victims. Out of 886 cases in the epidemic of 1907, 571 were below three years of age, 771 below five years and three were under six months of age. In the present epidemic, the youngest case I have seen was four and a half months old and absolutely breast-fed. The most susceptible period is from one to three years of age. There are four principal types which can be clinically fully described and proven by laboratory methods: the *abortive*, the *bulbospatial*, the *cerebral*, and *meningeal*, and the *bulbo-pontine* types. Wickman has described a neuritic type. These types can all be understood when poliomyelitis is regarded from the standpoint of an acute, infectious disease, involving certain parts of the general nervous structures, causing certain definitely marked pictures and there stopping, or going on to involve at one stroke the whole cerebrospinal axis and in this way causing a debacle of the whole substratum of the nervous economy. It is through the abortive type of the disease that these cases are spread to others. This type is that which does not go on to paralysis, recovers and does not leave the host injured as to the muscular motor apparatus. This type can be recognized so as to leave no doubt as to its distinct identity. A child of five years of age is attacked with a headache, slight malaise and an attack of vomiting lasting five days, intense pain in both lower extremities radiating to the soles of the feet and

worse at night, slight pain in the nape of the neck, lassitude, cerebellar gait on walking, increased reflexes in the lower extremities, rectal temperature above 100.5° . In ten days the pains have disappeared, the child is well and wants to go out and play. The abortive cases present prodromata such as headache, weakness, diminished reflexes and pain in the nape of the neck, with or without vomiting and fever, and still do not present paralysis and recover. The spinal or bulbospinal type is the most common and gives the disease its name. The patient has an attack of vomiting and slight fever and within twenty-four hours the mother observes the child cannot move one or the other extremity. These forms may have no fever, but it is possible in giving the history the mother may have overlooked the symptoms of fever, malaise and such indisposition as peevishness, which may have preceded by a few days the paralysis. In other cases, the paralysis appears gradually. Pain may continue to be quite severe, especially when the extremities are moved. The paralysis may spread and involve not only the remaining lower extremity, but the upper extremities, the muscles of the back and respiratory muscles of the thorax and possibly the muscles of the abdomen. As a rule, in the purely spinal cases, the paralysis appears and does not spread in the great number of cases. In others, it may spread from the extremities and involve the whole trunk, even to causing bulbar paralysis of the respiratory centers. But after the tenth day, paralysis is not apt to spread to the bulbar medulla, though cases have been known to die after the fifteenth day. Meningeal and cerebral types should be combined because of the cerebral symptoms which give rise to a picture closely simulating meningitis. The meningitic form of poliomyelitis runs its course with cerebral symptoms. A child of three is taken with vomiting for forty-eight hours, followed by rigidity of the neck with pain on flexion of the head, Brudzinski's sign and reflex, Kernig's sign, sopor and Macewen's sign which may be slightly marked; also diminished knee reflexes. Some patients may improve after a day or two, the fever may abate and they may even be about and then have a recrudescence of fever, sopor, rigidity, delirium, irritability, extreme hyperesthesia and pain in the nape of the neck. In some cases the only palsy may be ocular; in others a slight facial palsy may be present which may be combined with a weakness in one or other extremity. After a week, the patient becomes brighter. There is still, however, marked ataxia and Romberg's sign. As convalescence is established, the ataxia is the last symptom to disappear. The hydrocephalus and abnormal mental state may remain for some time after the temperature is normal. On recovery, there is a slight strabismus, ataxia, optic neuritis. In one group of cases I have seen unilateral ophthalmoplegia with hemorrhages into the retina. In lumbar puncture lay the differentiation in the form of poliomyelitis from cerebrospinal meningitis. The bulbar or pontine form of the disease deserves notice as a distinct form. An infant, breast-fed, thirteen months of age, was attacked with fever and vomiting. The fever continued into the afternoon of the following day when the mother

noticed a flatness on the right side of the face. The temperature continued at 102.4°, the infant was bright, laughed and played in the crib, but there was a tired look about the face and eyes. The knee reflexes were increased; otherwise there was no paralysis that could be demonstrated. In another case, ten days before the patient, aged twenty-one months, was seen, he was taken with high fever and vomiting, there were some green movements. The fever continued, in a less degree, to the ninth day when the mother noticed that the right side of the face was flat, there were tremulous movements of the head and arms and the patient was restless. There was constant jactitation of the head and insomnia; rigidity of the neck, but no palsies of the extremities; on the contrary, the patient exhibited great strength in both. In other cases, the outcome was not so favorable; there was an involvement of the nuclei which control deglutition and respiration. In these cases the patient may be lost by paralysis of the respiratory centers. The neuritic type included those cases in which pains in the extremities became a leading feature of the clinical picture. Some of these cases developed paralysis; others did not. They were referred to under the head of abortive cases. The symptoms given justify a lumbar puncture in order to establish the character of the fluid which in poliomyelitis shows a lymphocytic cytology and an increase of globulin. The examination of the blood was very uncertain. As to prognosis, the low mortality of 10 per cent. applied to children below eleven years of age and 27 per cent. among older children and adults. Twenty per cent. of all cases completely recover and the younger the child the better the prognosis.

DR. JAMES.—The following question has been handed up: "Would you advise the removal of adenoids or enlarged tonsils during this epidemic?"

DR. KOPLIK.—I would say "No" most decidedly.

ABORTIVE AND NONPARALYTIC CASES, THEIR IMPORTANCE AND THEIR RECOGNITION.

DR. GEORGE DRAPER.—Cases are designated as abortive when attention is centered on the paralysis as the chief symptom of poliomyelitis, but as our knowledge grows it has become increasingly evident that in dealing with acute anterior poliomyelitis we are dealing with a general infection that presents a great variety of manifestations. The cases that escape paralysis are just as important from the standpoint of the spread of the infection as the paralyzed cases and infinitely more dangerous. The cases that have hitherto been called "abortive" should be called "atypical," if we consider those that develop paralysis as typical. Unfortunately, there is no possible way at the present time of determining the number of cases that are not paralyzed. Undoubtedly the number varies greatly in different epidemics. There are certain indications, however, that lead us to believe that the number of cases without paralysis is considerable. It has been said that it is extremely rare

to see more than one case of poliomyelitis in a family, but a very careful investigation where there has been one case in a family frequently shows that another child has had mild symptoms, as fever, general malaise and vomiting. Furthermore pathological studies show that there may not only be lesions in the spinal cord but that the viscera and the entire lymphatic apparatus may be involved and we may find palpably enlarged lymph nodes. This is additional evidence that we are dealing with a general infectious disease.

In general all cases fall into the following groups: 1. *Gastro-intestinal*. 2. *Respiratory*. In these we may have the symptoms of influenza, cough, lung signs and pains in the bones and joints. 3. *Febrile*. 4. A type characterized by symptoms of *meningismus*. 5. The type in which *paralysis* occurs. In the first three types we may have slight transient paralyses. In the type showing paralysis we may have as prodromal symptoms any or all of the prodromal symptoms of the other types. The intensity of the symptoms is no guide to the prognosis. In this connection it is of interest that in fatal cases more extensive lesions of the cord have sometimes been found than were indicated by the symptoms. That there should have been this general degeneration of cord without manifestations suggests that we may have lesions in the milder cases that do not give clinical evidence of their existence. Wickman's and Müller's groups studied at autopsy brought out this fact. In times of epidemic every one is alive to these symptoms, but it is not enough that the physician should say this is or is not a case of poliomyelitis. In suspicious cases lumbar puncture should be made and the spinal fluid examined. There is usually an increase in the lymphocytic count and a very large percentage of polymorphonuclears, which change within twelve to twenty-four hours into mononuclears and in three or four days we have a leukocytosis. The albumin and globulin content of the fluid are increased, but less than in tuberculous meningitis.

The diagnosis is therefore based on gastrointestinal, respiratory, and febrile symptoms. Where we find the latter a search should be made for transient weakness and mild degrees of paralysis, and for local muscle tenderness. One point of value in diagnosis is the anterior spinal flexion sign. It is a very striking thing that before paralysis sets in the spinal flexion sign is definitely present, and this is probably responsible for the stiff neck and Kernig's sign. The sign is elicited by having the child place his hands under his thighs and then flexing his trunk forward, doubling him up.

In conclusion, it may be said that there is no question but that these atypical cases of poliomyelitis exist. They must be recognized and herein lies the problem. In learning to recognize them a double advantage will result. They, as moving sources of contagion, will be controlled, and cases which are destined to be paralyzed will be recognized in the preparalytic stage and helped, when help is discovered, and possibly saved from an oncoming paralysis.

THE PRESENT EPIDEMIC—THE TYPES WHICH IT PRESENTS.

DR. LOUIS C. AGER, Brooklyn.—Much that is suggestive may be brought out from our experience in the hospitalization of an immense number of cases. From June 20 until July 12 we cared for 320 patients with poliomyelitis in the Kingston Avenue Hospital. The resident staff were thus brought face to face with a large number of serious problems and a large amount of work has been accomplished.

Something has been done in the study of the infectivity of the disease, but the degree of infectivity has not yet been decided. Dr. Draper has spoken of the large number of abortive cases and in this class of cases we have more proof of the infectivity of poliomyelitis than we had before the epidemic of 1907. In this connection I would like to report the two following examples. On July 2 a child was taken sick with convulsions, vomiting and fever and recovered. On July 3 another child in the same family was stricken with the acute fulminating type of the disease and died within forty-eight hours. On July 4 an older member of the family developed the disease. A second group of cases was as follows. On June 20 a child became ill with the abortive type. On June 30 a second child came down with the fulminating type of the disease and death followed. On July 5 a third case occurred in this same family, which, in this instance, was followed by paralysis. There must be a large number of cases of the abortive type that are not recognized. In the Kingston Avenue Hospital we have at least eight series of cases where there have been two or more cases in the same family. A great many more instances of this kind would have been found if we had more complete statistics in 1907. About the only statistics that we have on this point are those published by Wickman and Medin. That there are practically no cases among the colored is borne out by our experience; among our 350 cases there has been no colored child. The incidence of the disease is practically the same in all nationalities.

There is no material enlargement of the liver or spleen, except in some fulminating cases. We found only two cases of enlarged liver in sixty-seven cases. The age incidence in the present epidemic is practically the same as in the epidemic of 1907. It is a peculiar fact that in epidemics in this country the age incidence is lower than in those on the other side. In eighty-one cases, forty-six occurred between the ages of two and five years; twenty-two between the ages of one and two years; eight between the ages of six and twelve, and three between one and six months. We had two adult cases in this group, one in a woman twenty-eight years of age and one in a pregnant woman of twenty-one years.

We found as usual that the lower extremities are most frequently paralyzed. In a group of sixty-four cases examined the lower extremities were involved in thirty-nine instances; in seven instances the upper extremities; in five there was facial paralysis, and in

thirteen cases the only definite symptom was marked paralysis of the muscles of the back. There were two typical ataxic cases.

The fulminating fatal cases gave the most pronounced symptoms. We had one peculiar and unusual case in a boy of eleven years. He was a well-nourished, well-developed child and when brought into the hospital his only symptom was markedly labored breathing. He asked for a drink of milk and it was noticed that there was a slight blur to his speech. He was unable to drink on account of pharyngeal paralysis. His diaphragm was completely paralyzed. The labored breathing was accomplished by the thoracic muscles alone. He stood up in his crib and was able to use his arms and hands, and his back showed no evidence of paralysis. He gradually became weaker and died five hours after entering the hospital. Another case of the fulminating type showed a general paralysis, practically all the skeletal muscles were effected, and there was marked respiratory paralysis. In both of these cases the heart was not affected. We have been trying artificial respiration immediately after death and in some instances have succeeded in bringing back the color after death had apparently set in. We still hope that in some cases something may be accomplished by this method. We employed the apparatus which Dr. Meltzer has been using at the Rockefeller Institute.

We may also speak of the meningitic type. We had one older boy who was wildly delirious. He had complete paralysis of one leg and one eye was totally blind. There was an alteration in his condition from deep meningeal coma to active maniacal delirium.

We have had six croup calls, that is, summons to intubate, and when we have reached the patient we have found respiratory paralysis and poliomyelitis.

It is sometimes extraordinary to see the rapid improvement in these cases. We have had small bottle-fed babies who were unable to take their milk at first and are now able to hold the bottle and feed themselves.

Our experience has absolutely convinced us that the only place to take care of children with poliomyelitis is in a hospital, unless the conditions of the hospital can be exactly reproduced in the home.

LABORATORY AIDS IN THE DIAGNOSIS OF POLIOMYELITIS.

DR. JOSEPHINE B. NEAL.—It is well known that sporadic cases of poliomyelitis are frequently seen when no epidemic exists. Because of this fact, during the past six years, it has been the lot of the Meningitis Division of the Department of Health to study both clinically, and by means of laboratory methods, many cases of this disease before the present epidemic occurred. Most of the cases seen by us, both before and during this epidemic, have been atypical and we have, therefore, been compelled when endeavoring to make a diagnosis, to consider our laboratory findings with more than ordinary care. As with most such procedures, the answers which the laboratory returns to our questionings furnishes us with evidence that is corroborative only and by no means absolutely diag-

nostic. Perhaps, one of the most interesting experiments employed in the study of poliomyelitis has been the inoculation of monkeys by means of washings from the respiratory and elementary mucous membrane. This was first successfully performed by Kling, Petterson and Wernstedt in 1911. It has since been repeated several times. Dr. DuBois, Dr. Zingher and I obtained washings from the nose and throat from an abortive case two weeks after the incidence of the sickness. With these we produced typical poliomyelitis in monkeys. In sections of the brain, from one of these monkeys, a few globoid bodies similar to those described by Flexner and Noguchi were found. A report of this work appeared in the *Journal of the A. M. A.*, January, 1914.

Another laboratory method of some diagnostic value is the so-called neutralization test. In this, serum from the suspected case in the stage of recovery is mixed with an old fatal dose of an active virus. These are incubated and later injected intracerebrally into the monkeys. Failure of the disease to develop indicates that the virus has been neutralized. This test, however, does not furnish conclusive evidence of poliomyelitis for sera from nose known to have been free from a recent attack of the disease has sometimes successfully neutralized the virus. It is, however, quite obvious that laboratory methods requiring the use of monkeys are both too complicated and too expensive for ordinary diagnostic use.

A study of the blood picture was exhaustively made by Peabody, Draper and Dochez of the Rockefeller Institute. It was shown that there existed a varying increase in leukocytes and a polymorphonucleosis. This is characteristic of so many other diseases that it is of little help in diagnosis.

The procedure which we find to be our most reliable and valuable aid in the recognition of poliomyelitis is the examination of the spinal fluid. In the first twenty-four to forty-eight hours after its onset, poliomyelitis must be differentiated from the early stages of epidemic meningitis or mild purulent meningitis and also from a meningism accompanying pneumonia or other infection. The clinical pictures presented by these above-mentioned diseases are quite similar and it is in the distinguishing between them that the examination of spinal fluid affords us the most valuable information. In the early stages of poliomyelitis, the spinal fluid is clear or rarely, it may be slightly cloudy. It often shows a good fibrin web formation. There is a slight to moderate increase of albumin and globulin and also of the cellular elements. The reduction of Fehlings is prompt. Those poliomyelitic fluids which are cloudy present a polymorphonucleosis which may run as high as 90 per cent. but which we usually find to be about 60 per cent. As a rule, however, 80 per cent. or more of the cells are mononuclears. In examining such fluids we have frequently observed the presence of large mononuclear cells which we believe to be in a measure characteristic of poliomyelitis. We are now studying these by means of the various differential stains in the hope that our research in this direction may develop something of positive diagnostic significance.

Two rare types of spinal fluids sometimes occur in poliomyelitis when hemorrhagic process has been more than usually extensive. The first of these is of the true hemorrhagic character, the red blood cells being evenly diffused throughout the fluid. When collected in successive tubes, the specimens are all homogenous showing no change in the intensity of the hemorrhage. This serves to differentiate it from bloody fluids obtained by the accidental puncture of a vein. The second of these rarer fluids illustrate the so-called syndrome of Froin. It has a characteristic yellow color and coagulates spontaneously.

The spinal fluid from early cases of purulent meningitis shows a varying degree of cloudiness, except in very rare instances when it may be clear. A greater increase in albumin and globulin is usually found here than occurs in poliomyelitis with a poorer reduction of Fehlings. The cells in these fluids of purulent meningitis are 90 per cent. or more polymorphonuclears and the etiological organism is found except in the mildest cases. In certain mild cases of meningitis probably of epidemic variety the meningococci may never be positively demonstrated in the fluid. In purulent meningitis due to other organisms, these practically always appear later. In one instance, I have seen a clear fluid from an early case of epidemic meningitis. This was of about eighteen hours standing. Although the cellular reaction was so slight, the meningococcus is demonstrated to be present in the fluid by smear and culture.

The fluid in meningism is increased in amount but practically normal in character.

When seen a week or more after the onset, cases of poliomyelitis especially if presenting cerebral symptoms must be differentiated from tuberculous meningitis. The spinal fluid in both these conditions is clear and increased in amount. The albumin and globulin content of both is also increased, but usually in poliomyelitis, the increase of both these last-named elements is not so great as occurs in tuberculous meningitis. The reduction of Fehlings is usually better and, here let me say, that many tuberculous fluids give a good reduction of Fehlings though the contrary has been stated. The cellular element is also usually less in poliomyelitis. In both conditions at this stage there is ordinarily a mononucleosis, although in some acute cases of tuberculous meningitis there is a polymorphonucleosis. If, however, as *may* happen occasionally, the increase of albumin and globulin is greater than usual and the reduction of Fehlings is not so prompt, then the determination of the disease must wait upon the results of animal inoculation if it has been impossible to demonstrate tubercle bacilli in fluids.

A detailed study of the spinal fluids of poliomyelitis examined at the Research Laboratory was made by Dr. H. I. Abramson, of the Meningitis Division and published in the Am. Journ. of Dis. of Children, Nov., 1915.

In brief, then, a spinal fluid increased in amount and showing a slight to moderate increase in albumin and globulin, a good reduction of Fehling's solution and a varying cellular increase mostly

mononuclear makes the diagnosis reasonably certain in fairly early cases of suspected poliomyelitis. A slightly cloudy fluid occurring very early in the disease must be differentiated as noted above from a similar fluid in an early purulent meningitis. Fluids from the cerebral or encephalitic type of poliomyelitis sometimes may be differentiated from fluids of tuberculous meningitis only by animal inoculation.

THE IMPORTANCE OF THE PRESENT EPIDEMIC.

DR. HAVEN EMERSON.—We are not able as yet to present our records in complete form. Thus far they show the date on which the cases have been reported instead of following the usual plan of giving the date of onset of the disease. For instance, in May only five cases were reported, while fifteen more cases which had their onset in May were not reported until in July. In June we see the rapidly rising incidence of the disease, beginning about June 20 and increasing until the highest point was reached about July 11. Since that time there has been a recession observed, but we cannot say it is permanent as yet. A study of the death rates for the city as a whole, of diphtheria, scarlet fever, measles and diarrheal disease during the last six years and the first six months of this year show that the number and the mortality of cases of poliomyelitis during this epidemic as well as during the period covered by these statistics, has been small by comparison. During the first six months of 1916 there were 884 deaths from diarrheal disease and fifty-seven from poliomyelitis. The community looks with complacency on the former while it is panic stricken over the latter. The interest at the present time is in the psychological state of the lay public. The reason for this is probably because this is the first epidemic of poliomyelitis in this city in which the disease has been made reportable and also the first in which there has been an effort at hospitalization. We acknowledge that our present method of attempting to control the disease is frankly an experiment. At the outset of the outbreak the Health Department was confronted with two alternatives. The one was secrecy, whether we should simply see what could be done by the medical control of cases without publicity. The other alternate was publicity which offered a better prospect of a real control of the disease. We decided in favor of publicity and hospitalization. As a result there has been an undue fright on the part of the public probably due to our unusual method of approaching the problem. Reporting cases was new, placarding houses was new, and hospitalization was new. In 1907 it was not until November that the epidemic that was then drawing to a close was studied. While that epidemic was in progress no study was made of it. In November, 1907, the Pediatric and Neurological Sections of the Academy of Medicine appointed a committee to make a study of the disease, but they were not active at the time the cases were coming down. In that epidemic there were probably 2500 cases. There were 700 cases accurately studied and the mortality among these was 27 per cent. The average mortality as estimated in foreign epidemics has

been from 7 to 10 per cent. During the present epidemic about 2600 cases have been reported but only about 1600 of these have proved to be true cases of poliomyelitis. It is estimated that the total death rate in the epidemic of 1907 was 5 per cent.; during the present epidemic it has been 18.7 per cent. The most important factors in dealing with the disease are early diagnosis, isolation, and putting all cases under early orthopedic and neurological observation. This method may save the individual and the public from the future burden that permanent crippling implies.

At least 99 per cent. of the children affected in this epidemic have been born since the last epidemic. It has been estimated that 917 cases have been under five years of age and that 14 per cent. of those affected have been between five and ten years of age. About 99 per cent. have been under ten years of age. About 403 cases have shown paralysis. In about 50 per cent. of the cases the paralysis made its appearance in the course of a few days after the onset of the disease. The longest period after the onset at which paralysis has made its appearance was sixteen days. In between 5 and 8 per cent. of the cases there are secondary or subsequent cases in the same family that may be traced to the primary case. When we get a second or third case in the course of three or four days it is safe to classify it as a secondary case. These facts are important since the public was not previously impressed by the infectious nature of the disease.

We can only suspect a person of being a carrier since we are unable to prove it as can be done in diphtheria and typhoid fever carriers. Thus it has been a question whether one has a right to interfere with a supposed carrier. It is to be hoped that this epidemic will clear up some of these doubtful questions.

This epidemic has also been the first opportunity we have taken to make use of concerted action on the part of the hospitals. This will probably result in a plan for coöperation in the future and will favor scientific advance in the study of disease. I would like to indicate that our experience has shown us the necessity of a hospital having a staff suited to meet the needs of these patients. Such a staff should include a laboratory diagnostician, a neurologist, an orthopedist and a pediatrician. I would urge hospitals likely to have these cases to organize a staff of this type for dealing with this epidemic. We can also make use of social service organizations to a greater extent than in other conditions. There is need of concentrated follow-up home work of all patients. This will be a great need for years after they have left the hospital. Many hospitals in the city are receiving cases of poliomyelitis. Quarantine and the services of Ellis Island have been placed at the disposal of the Health Department. This coöperation among the hospitals is a notable contribution to our progress and will probably result in some permanent plan that may be put to service on such occasions in the future.

There is nothing more discouraging than to meet with cases like the following which was met on July 4. On coming to a house we

were met by a small boy who was limping. We were led up-stairs by the boy and there found a younger brother who also limped. We were told that the baby which was sick had been sent out of doors in the carriage. This mother had seen no physician, though all three children were in the acute stage of infantile paralysis. She did not think these children were very sick because they got about so quickly.

There is another point of importance which shows the degree to which the medical profession will sacrifice itself to the public health. Many instances have come to my knowledge where physicians have for the time being lost their entire practice because they have been taking care of cases of infantile paralysis and their patients have been afraid to come to them. I would like to ask other physicians to see that such men do not suffer because of their willingness to sacrifice themselves for the welfare of those who have needed their services. I hope that wherever you meet this attitude of fear on the part of patients you will discourage it.

In closing I wish to appeal to the medical profession, for their coöperation in early diagnosis and the early reports of cases for no health department, however efficient, can control an epidemic and secure proper police enforcement of its regulations without this coöperation. It is to be hoped that as a result of this meeting we will have many previously undetected cases promptly reported to the Department of Health.

DISCUSSION.

DR. WILLIAM H. PARK.—I have very little to add, only one or two points that I would like to emphasize. I wish to speak along the line on which Dr. Flexner has spoken. He and Dr. Noguchi have added much that is new to our knowledge of poliomyelitis and we have been applying what they have taught us. Up to the present time we know that the sick person is the one responsible for most of the contagion and that the carrier also spreads the disease. It is not spread in any other way so far as we know. There is no known carrier as a fly or insect. We do know that the sick person, the carrier, and filth that has been contaminated by the sick person or carrier may convey the contagion. If an insect is found to be a carrier it will probably be in a subordinate degree. It will be very difficult to prove that an animal that has been inoculated is a carrier of the infection. I believe that even if we could detect the carrier of poliomyelitis as we do those of diphtheria, typhoid fever and pneumonia we would not act differently than we are doing. We have the knowledge necessary to detect diphtheria and pneumonia carriers and yet we have done little with this knowledge to prevent these diseases. It is not in lack of knowledge that the difficulty of controlling the carrier lies. From what has been done in other lines it is possible that we may learn to do more with vaccines or serums, but at the present time we have no knowledge that we can offer. We have just begun to study and to work along these lines and it is probable that in six months from now we may be able to announce some discoveries.

DR. WALTER B. JAMES.—A doctor from the midst of the infected district has asked what the modern treatment for poliomyelitis is. Someone else has asked if it is safe to care for cases of poliomyelitis in a general hospital.

DR. HAVEN EMERSON.—We have found that it is perfectly safe to admit cases of poliomyelitis to a general hospital. There all sanitary precautions are carried out and there have been no instances of doctors, nurses or attendants being infected.

DR. HENRY KOPLIK.—It is very difficult to speak about the treatment of a disease the cause of which is still under investigation. The treatment of the disease at this time can be only symptomatic. There may be a destruction of parts of the nervous system or the process may go on to a destruction of the entire cerebrospinal system. The patient should be isolated and kept absolutely quiet. Anyone in attendance on a patient should wear a gown and on leaving the patient should cleanse his hands. Other children should be kept away from the patient. Absolute quiet is important and should be emphasized, and also rest. A German physician in Munich has recommended that the patient be placed in a Bradford frame and thus kept absolutely quiet. Together with absolute quiet the patient should have plenty of fresh air and an easily assimilable diet. The bowels should be attended to. As to medicine, I have no particular remedy except the remedies supposed to have an effect on the general nervous system. Liberal doses of urotropin have been employed but whether this has any definite value cannot be said for as yet we have not established its utility.

The question may be brought up as to lumbar puncture. In the first place the mere mechanical removal of a certain amount of fluid which is toxic may be of some benefit. In the second place it gives the opportunity to make a diagnosis, and in the third place it relieves pressure. It is from the pressure that we get Macewen's sign.

If paralysis starts in, it is a relief to the patient to keep his limbs absolutely quiet and in some cases a cast may be applied to prevent contracture. We can sometimes see when the cast is removed that it has overcome the contracture of the muscles. This contracture may return later and then the patient may be referred to the orthopedist. For the symptoms referable to the nervous system, anodynes, as chloral and the bromides, may be administered, but not opium unless it is absolutely necessary. Charcot has recommended the intramuscular injection of strychnine as soon as the pain and fever have stopped. The question has been asked as to how strychnine acts, it may be stated that it causes an increase in mechanical irritability of the muscle. The child bears quite large injections. One-fortieth of a grain daily may be given over a period of thirty days, selecting different groups of muscles for the injections. Many cases, however, have regained their power without injections, and many do not, so it is very difficult to give an accurate judgment as to the utility of these injections or as to when to use them. Warm

baths sometimes prove a great blessing if they can be given without moving the patient too much.

Massage sometimes seems to aggravate the condition; in other instances it seems to relieve the pain. In some little patients iodide of potassium in large doses seems to have an anodyne effect, indeed this effect has been almost miraculous in a few cases. The pain seems to be relieved much more by iodide of potassium than by other remedies. The great variety of peculiar mostrums that have been recommended should not be used on these children. There should not be too much activity in the treatment of these cases as one may injure the patient. The most important thing to keep in mind is the necessity for absolute quiet. No attempt should be made to increase the tonicity of the muscles until the active stage of the disease is passed.

DR. LEON LOURIA, Brooklyn.—There is nothing to be said that has not been laid before you. I have been interested in the advances that have been presented by those who have given this subject many years of study. Your attention was especially called to those cases that do not show any paralysis. I would like to speak mainly upon this subject. The epidemic can only be stopped by an early recognition of those cases that do not lead to paralysis. We must revise our medical nomenclature so that we may include and treat poliomyelitis without paralysis. Some cases have no symptoms of paralysis. In a few cases I have noticed a very interesting occurrence. A child would be taken ill with some indefinite febrile manifestation and sore throat, be treated in the ordinary way and seem to recover, only to have a recurrence in three or four days when it would get the definite symptoms of poliomyelitis and a definite paralysis. If the disease had been recognized and the child placed in bed and given the opportunity to rest that the nervous system required and was not exposed to the additional trauma consequent upon activity, the virus would not exert as great an effect. The same treatment should apply to the abortive form of the disease as was given to the paralytic form and in this way the development of paralysis might be prevented. I have seen two or three cases in the same family. In two instances in which the disease was of the abortive type, two weeks later the disease in the same child became more severe and a definite paralysis developed with permanent deformity. There is no doubt that the disease is carried from the sick to the healthy child, while those in attendance on the sick are likely to bring the disease to others, that is, they are carriers of the disease, and they may create a focus of disease. A healthy person may travel into an infected district, become contaminated, and then implant the virus in another locality. Scientists all agree that the disease is transmitted by direct contact and thus children that are slightly ill and whose illness is not properly interpreted are a prolific source of the disease. If we are assembled here that we may be prepared to help the health authorities in their endeavor to control this disease we should be called upon to make

an early diagnosis and not to take lightly those ailments that may be abortive types of poliomyelitis.

DR. SAMUEL J. MELTZER.—The several papers presented this evening failed to cover one essential phase and that is the treatment of the disease. The reason for it is to be found, perhaps, in the discouraging fact that there is at present practically no treatment for poliomyelitis. I wish to bring forward three promising therapeutic measures based essentially upon personal work. However, since I have only five minutes at my disposal, my remarks must be of necessity dogmatic and very brief. To gain time I have put them down in writing. My practical suggestions have to be introduced by the following considerations. Any inflammatory focus is surrounded at the periphery by zones of hyperemia, exudation and edema. Thirteen years ago, in experimenting upon rabbits' ears, we found that an injection of adrenalin reduces an entire inflammatory swelling to a very small focus in the center. The peripheral zones of edema and active hyperemia disappear completely for some time. Several years ago Dr. Auer and I found further that an intraspinal injection of adrenalin into monkeys produces a long-lasting effect upon the blood pressure, longer than by any other method of administration; more than one hour may pass before the blood pressure returns to normal. On the basis of these observations and on the further plausible assumption that the early stages of the paralytic effects in poliomyelitis are not caused by the chief inflammatory focus but by the peripheral zones of active hyperemia, exudation and edema, I induced Dr. Clark, then working under Dr. Flexner at the Rockefeller Institute, to make the following experiments. Monkeys dying from experimental poliomyelitis received intraspinal injections of adrenalin. The beneficial effect was most striking. Animals which were paralyzed and moribund at the time of the injection were seen several hours later eating bananas which they held themselves. The paralytic conditions were strikingly improved and the life of the animals was prolonged in some cases for several days. The animals finally died; but in this series of Dr. Clark's experiments, all animals received *reliably fatal* doses of the virus. It is important to bear in mind that the mortality in human infantile paralysis is generally not more than 25 per cent. Death is usually due to respiratory paralysis. It is highly probable that in many instances the respiratory paralysis is not produced by the chief inflammatory focus, but by the extensive peripheral zones of exudation and edema, which are surely capable of interfering with the vitality of the nerve centers controlling the respiratory mechanism. If the exudation and edema could be removed for some time, the life of a few or of many cases might be saved, namely, if in these cases it should just happen that the ascending progress of the actual inflammation came to a standstill. On the bases of these facts and considerations I recommend the injection of adrenalin intraspinally in every case of infantile paralysis, the injection to be repeated from four to six hours. The procedure may save life, and in surviving cases it may reduce the extent of the final lesion. There is no danger to

this procedure. Monkeys stood well as large a dose as 2 c.c. in a single injection. However, in human infantile paralysis the injections should be begun with a dose of 0.5 cc. of adrenalin until more is learned about the effects. One suggestion is to administer artificial respiration by means of our apparatus for pharyngeal insufflation as soon as the patient shows a degree of unconsciousness and respiratory insufficiency. It is an easy and reliable procedure. The second suggestion is to administer oxygen under pressure in a respiratory rhythm by an apparatus which I have recently devised and used on human beings in several instances. It abolishes rapid cyanosis and may save life. It may even act specifically on the virus of poliomyelitis. I shall not attempt to enter upon a description of either of these apparatus, nor on the mode of their application and on the experience we had with them.

TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY.

(Continued from page 171.)

REPORT OF A CASE OF INFLUENZA IN AN INFANT WITH TWO UNUSUAL COMPLICATIONS, PURPURA AND SUBCUTANEOUS EMPHYSEMA.

HENRY T. MACHILL, Toronto.—“This baby when seen in consultation was six and one-half months old and had always been well and healthy, weighing 15 pounds before the present illness. The child was taken ill with grip on March 28 and was seen by Dr. More on April 6, at which time there was present a well-developed lobar pneumonia of the right base. The child's temperature was 104° F., pulse 140, and respirations 60. In addition there was a purpuric rash over parts of the body, the face, particularly the chin, the shoulders, arms, chest, legs and feet. The petechiæ varied in size from a mere dot to one patch on the left shoulder the size of a ten cent piece. Another patch on the left cheek was slightly smaller. These large spots had a punched-out feeling to the palpating finger as though they had previously contained fluid. The skin was unbroken and there had been no discharge.

“The mother stated that this rash had been present from the first appearance of the illness. There was a cough which was neither frequent nor violent. On the 13th of April the attending physician noted a slight swelling at the sides of the neck, under the chin and down over the upper part of the chest. The swelling continued to increase until two days later when I was called to see the child again. At this time the child's condition with reference to temperature, pulse and respirations had improved and the lung had about cleared up. The petechial spots had increased in number especially about the chin, the shoulders, and the forearm. The swelling around the

neck, cheeks and chest had increased to such an extent that the chin was crowded upward and the head forced backward. It was tense, tympanitic and crackling under the fingers. This swelling was symmetrical in size and obviously emphysematous.

"The emphysema gradually improved, and within five days from the time I saw the patient it had almost disappeared. On April 19th the child had an extra severe coughing spell when the emphysema suddenly became more marked, his breathing became embarrassed, and he died within twenty-four hours. An autopsy was not allowed. Purpura as a complication of influenza so far as I can find in the records of the Academy of Medicine of Toronto is not mentioned. In the *Lancet*, January, 1890, under the title "Occurrence of Rash in Influenza," H. P. Hawkins was able to quote seven cases with a rash in 1000 cases of influenza at St. Thomas' Hospital in London. From the description of these cases some were undoubtedly medicinal rashes. It must be concluded that purpura as a complication of influenza is infrequent. Emphysema is mentioned in a few textbooks as occurring occasionally in pertussis, bronchitis, etc., but I have not seen it mentioned in connection with influenza."

A BRIEF REPORT OF SIXTY BLOOD EXAMINATIONS IN INFANCY, WITH
A REVIEW OF THE RECENT LITERATURE OF THE BLOOD IN INFANTS.

DR. H. M. McCLANAHAN AND DR. A. A. JOHNSON, Omaha, Neb.—
"This investigation was made in an institution which takes infants for adoption and is primarily a home and not a hospital. We have studied the current literature in the English language for the period of 1910 to 1915, inclusive, and have abstracted the articles on this subject. After going over this literature we decided to limit our work to the relative percentages of the white cells, since there were only two articles dealing with this phase of the subject. The first of these is by Schloss (*Archives of Internal Medicine*, vol. vi, p. 658, 1910). He calls attention to the variations in the percentage of the different varieties of leukocytes in apparently normal infants. This is in line with our experience. His percentage of eosinophiles averaged higher than in our series. Second, Mitchell (*Jour. Diseases of Children*, vol. ix, p. 358, 1915) studied the leukocyte count during digestion in bottle-fed infants. He studied fifty infants making a count every half hour after every feeding until the next feeding. His conclusions were that leukocytosis occurred constantly in only 12 per cent. of the cases. In 32 per cent. of the cases it occurred occasionally, and in 56 per cent. leukopenia occurred constantly. In the present series the blood was taken from the infants without regard to the time of feeding. The counts were made in a total of eighty-one infants, ranging in age from three weeks to one year. The counts were made by Dr. Johnson and Dr. Moore and as their work was done independently it was necessary to eliminate ten infants upon whom the count was made twice. There was considerable difference in the counts of small and large lymphocytes

between the two observers. In the tabulation the large and small were grouped into one class. The following table shows the results:

Age	Cases	Lymph.	Polys.	Trans.	Eosino.
Under 2 months.....	20	64	28	5	1
2 to 4 months.....	17	69	25	5	1
4 to 6 months.....	3	60	35	5	0
6 to 8 months.....	5	55	40	4	0
8 to 10 months.....	6	52	44	5	2
10 to 12 months.....	17	64	31	5	0

Dr. Johnson counted the slides from twenty of these cases two months after the first count.

Schloss quotes the following percentages of eosinophiles, averaged from one to six-month-old infants, and five six- to twelve-month-old infants who were acutely ill had hemoglobin more than 50 per cent.; these suffered from no condition recognizable as a cause of eosinophilia. For infants one to six months the maximum percentage of eosinophiles was 9.35; minimum 0.35; average 3.59. For infants three to twelve months old, the average was 0.76 per cent. These findings indicate remarkable oscillation. Rosenstern found eosinophiles above 3 per cent. in none of six normal breast-fed infants, but in artificially fed infants the percentages varied from 0.7 to 4 per cent. The highest percentages were in infants from two days to two weeks old. He calls attention to the pronounced variation in percentages of the different varieties of leukocytes in apparently normal infants and that there is a uniform increase of polymorphonuclears and decrease of lymphocytes with advancing age. In apparently normal infants the percentages are frequently above the normal for adults, but rarely above 5 per cent. and never above 6 per cent.

DR. OSCAR M. SCHLOSS, New York.—“Up to the present time few blood counts have been made on normal children. It is desirable to have the normal count as a basis for the interpretation of the count in pathological conditions. I have made some counts which showed the same thing that Dr. McClanahan had called attention to, namely, that it is a matter of great difficulty to establish a normal average for the white cells since they showed a very great variability. It is also very difficult to classify the large and small lymphocytes. In these counts it would be more accurate to state the maximum and the minimum than to attempt to state an average.”

THE CREATININ AND CREATIN CONTENT OF THE BLOOD IN CHILDREN.

DRS. BORDEN VEEDER and MEREDITH, St. Louis.—“There is comparatively little data on the creatinin and creatin content of the blood, though there have been some studies of the creatinin-creatin

content of the blood in nephritis. The figures obtained by Folin and Denis, Myers and Fine, and Meyers and Lough differ widely. Because of the difference in the creatin-creatinin metabolism in adults and children, as measured by their content in the urine, we decided to test the blood of a number of children with different clinical conditions and compare the results with the total non-protein nitrogen of the blood. Folin and Denis found that the content of non-protein nitrogen in the blood of a healthy adult was from 22 to 26 mg. per 100 c.c. Later they published determinations made in a large number of clinical conditions which showed that there is a definite increase or retention of the nonprotein nitrogen in nephritics with uremia and that greater variations are found in the blood of hospital patients. Slightly higher values were not necessarily associated with renal disturbance. These findings have been confirmed by a number of observers. There was an increase of from 4 to 6 mg. after a full meal, and usually a slight increase in acute infections. In nephritics the content might vary from normal to ten times normal, the high values being found in actual or impending uremia. In children the nonprotein content did not vary in any marked degree from the adult. Tileston and Comfort made determinations on fifty-one children with a variety of clinical conditions. Normal children gave values of from 20 to 34 mg. per 100 c.c. Only one case, a child with acute nephritis, showed a definitely increased value 63 mg. per 100 c.c. In this case the content became normal with the disappearance of the uremic symptoms. The rest of the observations were on children with acute and chronic infections in whom normal values were found. In normal infants the nonprotein nitrogen content has been found to vary between 23 and 44 mg. per 100 c.c. by Schultz and Pettibone, whose observations were made on nine infants from one-half hour to ten days old. The methods used in the present study were those of Folin and Denis for the nonprotein nitrogen and of Folin for the creatin and creatinin. Determinations were made on seventy children. Many of these, particularly those with scarlet fever, were tested a number of times. The blood was taken early in the morning before the children had had their breakfast, and thus some twelve hours after the children had had their last meal. The cases are grouped into normals, scarlet fever at the time of the exanthem when there was an elevation of temperature, afebrile scarlet fever in the first week, and a number of examinations made in the third week of convalescence when the urinary findings were negative. In addition a number of miscellaneous conditions were also investigated. The creatinin figure for normal children varied between 0.58 and 3.44 mg. per 100 c.c. In ten children the figure was under 2 mg. and in two above. The febrile scarlet fever cases varied between 1.08 and 3.82 mg. but with one-half above 2 mg. and none under 1. The highest figure in the early febrile case was 2.78, but in one-half the cases the content was a little over 2 mg. Like variations were encountered in the miscellaneous conditions. There was no specific retention in any of our cases, although as a whole the figure for the creatinin

content of the blood in children is somewhat higher than for the adult. A comparison of the creatinin content with the nonprotein nitrogen has been made, and the results tabulated. As a general rule, both the nonprotein nitrogen and creatinin were within the same general limits as had been found for normal adults, and as Tileston found for the nonprotein nitrogen in children, although the average figures for both are a little higher in children. We have studied six cases of nephritis.

The retention figures in these were not high and but one case was fatal. This was not a uremic case. The nonprotein nitrogen was not increased in two cases and the creatinin was normal in three. In one case with a low nonprotein figure the creatinin was high and in two an opposite condition held. As the nephritis in a given case improved the amount of retention decreased. One of the cases cited illustrated this. A number of cases of scarlet fever were followed from the stage of the acute exanthem until desquamation was completed and tests were made weekly for five weeks. None of the fourteen cases followed developed a typical postscarlatinal nephritis in the third or fourth week. After the acute febrile period was over there was usually a slight fall in the nonprotein nitrogen and creatinin although in the second week a few showed a slight increase. One severe toxic case which died in the third week showed an increasing retention. The kidney in this case showed acute fatty degeneration. There is no apparent relationship between the amount of creatin and creatinin. We have found much less creatin in the blood of children than Folin reports having found in adults (about 10 mg. per 100 c.c.). We found in the blood of children, rarely over 5 mg. per 100 c.c. and the figures for the total creatin-creatinin was rarely over 6 mg. This is interesting in view of the fact that creatinin is found in the normal urine of children and is not present in the urine of adults. We have been unable to find any specific relationship between the amount of creatin and creatinin, or any relation between the amount of creatin and the clinical condition. There is no fixed relation between the total nonprotein nitrogen and the creatinin-creatin content. Determinations made on a child starved for other purposes, showed a slight increase in the content of all three substances during the period of starvation. In a few experiments made with reference to the effect of diet and copious water drinking the results seemed to show that these factors were negligible in these cases. Several children were placed on a fixed creatin-free diet for six days and an analysis of both urine and blood made daily after the second day. In the first case both the absolute and relative amount of creatinin of the blood varied quite considerably, while in the second it was quite uniform. What mechanism controlled the relation between the amount in the blood and the quantity of the urine they were unable to ascertain."

THE HOSPITAL CARE OF PREMATURE INFANTS.

DR. L. E. LAFETRA, New York.—"This paper is a resumé of my personal experience in the observation and treatment of these cases.

During the past two years there have been admitted to the infants' wards of Bellevue Hospital 278 premature infants. Of these 13 are still in the wards and 265 have been discharged. There is perhaps no other institution, either here or abroad, that has so many such cases. The mortality among these infants is very high but most of it occurs during the first few days after admission to the hospital. But a great deal could be done even for the smallest and feeblest of these infants. The records of the last 200 cases show that 30 were saved, and discharged as cured, that is strong enough so that their mothers could care for them successfully. Of the 170 that died in this last 200 cases, 90 died on the first day, many within an hour or so of admission; 28 more died on the second and third days, making 118 that died within the first three days. The smallest infant that was discharged cured had an admission weight of 2 pounds 13½ ounces. The baby remained in the hospital seven months and weighed 5 pounds 6½ ounces at the time of discharge. Three years ago, while visiting the children's clinics on the Continent, I learned that the smallest premature infant they had successfully reared in Paris weighed 800 grams. It is most unusual that a baby weighing less than 2½ pounds is saved. The greatest majority of infants admitted to the premature wards have a history of uterogestation between seven and seven and one-half months. In this respect it must be remembered that the history must not be depended upon. Taking the averages of infants at six, seven and eight months uterogestation, it will be found that there are many exceptions. The causes of prematurity, aside from mental and physical shock, are syphilis, some acute disease in the mother, extreme youth of the mother, or of both parents and connected with this, illegitimacy.

"The occurrence of twins or triplets, or other multiple pregnancies, is a very important factor. Aside from the small size and weight of these infants they show extreme muscular feebleness which extends even to the muscles involved in sucking and swallowing. In many instances this is the underlying cause of fatal inanition. Another symptom manifested by nearly all of these babies is a temperature far below normal. The skin is imperfectly developed and the subcutaneous fat is deficient or lacking, so that the infant radiates more heat proportionately than an infant of normal size. Again the heat-regulating center seems not to be in satisfactory operation, of that the baby is thermolabile, that is very susceptible to the heat chances of its environment. These babies also show a tendency to attacks of cyanosis and are extremely susceptible to all sorts of infection. The skin and mucous membranes are very permeable to germs so that extreme care is necessary to prevent abrasions and to avoid contagion from other persons or from contaminated clothing or apparatus. Absorption from the gastrointestinal tract of deleterious substances whether as the result of fermentative processes in the intestines or of germ infection may cause profound and even fatal disturbances in a very short time. General sepsis may arise from this source or may come from the umbilical wound or from an abrasion of the skin.

"In the general management of these children the aim is so far as possible to reproduce the conditions of intrauterine life. The baby should be kept in an even temperature approximating that of the human body and should be shielded from all sorts of external shocks, whether thermal or mechanical. The skin should be protected from chance of contagion and injury and the eyes should be protected from light. The inhaled air should be moist, comparatively warm, and as free as possible from germs. The food should be such as to require the least possible amount of digestive effort on the part of the baby. As to the use of the incubator, my experience with most incubators and their methods would lead me to advise against their use. The plan of setting apart a small room as an incubator room is much more satisfactory in every way. Here the baby does not have to undergo any chilling when the clothing is changed. The most complete incubator rooms have the air drawn in from outdoors, in cities preferably from the roof, then warmed, filtered, and moistened. The temperature of the room is regulated automatically. Such an installation is quite expensive.

"Probably the most satisfactory incubator is that devised by Dr. Edwin B. Cragin and described in the *Journal of the American Medical Association* for September 4, 1914. At Bellevue on account of the prospect of a new Childrens' Ward a very simple and inexpensive premature ward has been devised. The sunny corner of a ward facing south was partitioned off and double windows and transoms installed. The number of radiators was increased. Ventilation was secured by means of the transoms and the door leading into the rest of the ward. The premature ward has a capacity of ten beds and a cubic air space of 1000 feet per crib. Moisture is obtained by keeping a large pan of water simmering on an electric stove. After much experimenting we found that the babies did best when kept in a temperature of 76° F. to 80° F. with a humidity of 60 to 70 per cent. Incidentally we have found the warm room of great advantage in managing feeble infants that are not premature. The premature baby should be handled only when necessary to change the gauze diaper. The clothing should be the simplest possible. Babies weighing less than 4 pounds should be wrapped in cotton and kept so swathed until the temperature remains constantly at normal and the weight has risen to 4 or 4½ pounds. After the initial sponge bath and oiling no bath should be given for four or five days; then a sponge bath may be given every other day for a few days and then every day. In order to feed these babies we must often put the food into their mouths and even into their stomachs. In general the most satisfactory method of feeding these babies is to use the Breck feeder. After the warm food is placed in the tube the nipple is put into baby's mouth. This has the advantage of teaching the baby to draw upon the nipple but without exhausting the baby's strength. Feeding by the medicine dropper is not so satisfactory, because it does not teach the baby to suck. In some cases the baby cannot swallow satisfactorily and then it is necessary to resort to gavage. It is found that the baby is less likely to vomit if the tube is passed

through the nose. The food most suitable and that requiring the least digestive effort is breast milk. At Bellevue three wet-nurses are kept constantly to supply breast milk for the premature babies. In all private cases an effort should be made to secure good breast milk, either from some maternity hospital or, better, from a wet-nurse kept in the house with her infant, the latter to keep the breast milk from drying up. The milk is to be expressed from the breast two or three times a day and a requisite amount mixed with either whey or barley water or gralum as a diluent and then fed to the baby from a Br  ck feeder. At Bellevue we use one-half breast milk and one-half whey at first, 1 ounce being given every one and one-half to two and one-half hours, depending upon the size of the baby and its stomach capacity. If it is impossible to obtain breast milk a cow's milk modification using 6 per cent. top milk as the basis and diluting with whey or gruel made from Imperial gralum, or both. Five ounces of 6 per cent. milk, 10 ounces whey and 5 ounces Imperial gralum are used to make a 20-ounce mixture. To this is added milk sugar or dextro-maltose $\frac{1}{2}$ to $1\frac{1}{2}$ ounces. The number of calories per kilogram required by the premature baby is much higher than for babies at full term. It is necessary to increase the calories to one and one-fourth to one and one-half times the ordinary requirements. An important apparatus in the premature room is the oxygen tank all coupled up and ready for instant use in case of cyanotic attacks. As to prognosis, the weight is the best criterion we have but we must not despair of even the smallest babies. If a baby has survived for a week it has a better chance to live, no matter what the weight, since the fact of having survived that long augurs a good constitution."

DISCUSSION.

DR. BORDEN VEEDER of St. Louis said: "We have a premature ward in the St. Louis Hospital in which the heat is furnished from an adjoining closet and the ventilation by means of a transom. We keep the temperature at from 80° to 88° F. and the babies wear scarcely any clothing. A great many of the babies get more than 125 calories daily; some get as much as 185 calories. We have also observed that sometimes after a baby has gained for a time it does not gain so rapidly and that then if it is dressed as an ordinary baby is dressed and put out into the ward the weight would begin to go up again."

DR. JULIUS P. SEDGEWICK of Minneapolis said: "Dr. Le Fetra has spoken of a short interval between feedings, one and one-half to two hours, but others have been able to employ a four-hour interval. There is probably a difference in the technic of the feeding that accounts for the success with the four-hour interval. The four-hour interval can be used and has some points in its favor."

DR. LAFETRA of New York said: "I have not been successful with the long interval between feedings and would be glad to have Dr. Sedgewick give us some of the points in the technic by

means of which they have been successful with the four-hour interval. When I used the four-hour interval the child did not get sufficient food in twenty-four hours and it seems evident that there was something in the technic that we did not know."

DR. SEDGEWICK said: "There is one point with reference to getting enough food into these children and that is that they can be given more food than the stomach capacity would indicate. We do not use as much as 180 calories, but usually from 120 to 150, and we have no trouble in administering this amount. If the child cannot take it in the ordinary way it is given by tube. We always use breast milk and the amount given depends upon the size of the baby. We usually go slowly at first, starting by giving feedings of from 10 to 15 c.c. five times daily, making about 75 c.c. a day. This amount is increased as rapidly as the baby can bear it. We have no rule of giving so much at such and such a time, but are guided entirely by the needs of each individual child."

DR. B. RAYMOND HOOBLER of Detroit said: "It is possible to devise an incubator that could be installed in a home. This may be done with a clothes basket and barrel hoops, arranged to make a tent, and covered with blankets. The heat can be furnished by ground-glass electric-light bulbs and the child's eyes protected from the light by black cloth interposed between the child and the light. With such an arrangement the temperature in the tent can be kept very constantly between 85 and 90° F."

FURTHER EXPERIENCES WITH HOMOGENIZED OLIVE-OIL MIXTURES.

DR. MAYNARD LADD, Boston.—"In February, 1915, before the New England Pediatric Society and in June before the American Pediatric Society, I called attention to the possible uses of the homogenizing machine of M. Gaulin of Paris, for purposes of modifying milk for difficult cases of feeding, especially those showing intolerance for fat. Homogenization of liquids of different densities consists in reducing the constituent elements to such a physical condition that they will no longer separate but will maintain a permanent and even composition throughout the mixture. It is possible by this process to improve the emulsion of a modification of cow's milk so that it will be even finer than that of breast milk without altering in any way the chemical properties of the milk. There is reason to believe that such a milk may be better digested and assimilated. More interesting is the possibility of substituting some other fat than cow's milk fat in cases of malnutrition, in which it is often difficult to give fat enough to make a child gain normally in weight without precipitating sooner or later a digestive crisis. The principal difference between the fat of cow's milk and that of breast milk is in the size of the fat globules and the proportion of volatile fatty acids. The nonvolatile fats are made up mostly of olein and palmitin in both cow's milk and breast milk. Olive oil is almost wholly olein and palmitin and free from volatile fatty acids. It was my suggestion, therefore, to use olive oil to obtain the fat percentages in modified milk mixtures and so to eliminate the volatile fatty acids; and also by homogenization to secure an emulsion as fine or finer than human milk. The

milk sugar and proteins were to be obtained from skimmed milk as usual, and additional carbohydrates in the form of dextrin-maltose and starch prescribed according to the usual indications.

"This method of feeding has been applied to thirty-seven cases, the present series including the subsequent histories of the cases reported last year. A normal healthy baby gains, according to a high standard of growth, an average of 18.7 ounces per month. In this series of thirty-seven cases, whose average gain on previous feedings was 5 ounces per month for a period of 6.3 months, the average gain per month was 18.15 ounces on the homogenized olive-oil feeding. The average period of feeding was 4.7 months, a sufficient time to determine its permanent effects. The improvement in the babies' general condition has been as striking as the gain in weight. Vomiting and sour regurgitation, when present as symptoms, quickly subsided. The child improved in strength, in the quality of its fat, and in the development of its functions, as one would expect it to do in normal successful feeding. In some cases the mixture was heated to 212° F., in others given unheated. Limewater was usually given in amounts of 5 to 10 per cent. of the total mixture, but not as a matter of routine. The percentage of olive oil was almost invariably started at 1.50 and did not exceed 3.50 per cent. The total carbohydrate was usually started at about 5 per cent. and never exceeded 7 per cent. The proteins were started at 1.50 per cent. and seldom exceeded 2 per cent. Hunger is the safest guide to the child's tolerance to the amount of fat it is taking. This method of dealing with fat intolerance and other cases of difficult feeding is applicable in cities supplied by milk laboratories and in hospitals which will incur the expense of installing a homogenizing machine.

"Owing to the courtesy of Dr. Bowditch, Dr. Wyman made use of the suggestion that olive oil homogenized milk mixtures be used in the early days of convalescence from diarrheas due to indigestion and fermentation. The general scheme of treatment was as follows: After the initial period of catharsis and starvation, a fat-free lactic acid milk, diluted two-thirds or one-half was given. If the infecting organism proved to be of the Flexner or Shiga type, dextri-maltose was added up to 4 or 5 per cent. and sometimes barley water. If the gas bacilli was present no carbohydrates were added. After a period of several days, when the acute febrile disturbance showed signs of subsidence, olive oil was homogenized with the lactic acid milk, in percentages of 1.00, 1.50 and if well tolerated 2.00; this added considerably to the caloric value of the food and prevented or lessened the loss of weight which occurred in such cases. There were nineteen cases of infectious diarrhea, fifteen of the Flexner type bacillus, one of the gas bacillus type, and three undetermined. Four cases died giving a mortality of 22 per cent., about the same as in the other services. Of the fifteen cases that lived, eight were in the hospital for an average of twenty-one days and each lost over their entrance weight about 15 ounces. Seven were in the hospital on an average of fourteen days each and gained an average of 10.7 ounces over their entrance weight. The average net loss of all the

fifteen surviving cases was therefore only 3 ounces over the entrance weight. It seems from this series of cases that olive oil homogenized can be given safely after the acute febrile stage has passed and in the period of convalescence and is more effective in making up the loss of weight than the fat of cow's milk.

"A study of the fat metabolism of infants fed on homogenized milk was carried out at the Boston Floating Hospital by Dr. C. H. Laws of the University of Michigan. There were four cases. The result of the experiments in these might be objected to because of the artificial conditions imposed by the experiments but the results of the clinical cases extending over a period of nearly five months, on an average, were of decided significance and justify the belief that homogenization of milk mixtures and the substitution of olive oil for cow's milk fat offers an additional and valuable resource in infant feeding in cases of difficult digestion with malnutrition."

(To be continued.)

BRIEF OF CURRENT LITERATURE

DISEASES OF CHILDREN.

Spinal Fluid in Poliomyelitis.—The material for a report by H. L. Abramson (*Amer. Jour. Dis. Child.*, 1915, x, 344) is taken from the records of the meningitis department of the New York City Board of Health and consists of forty-three cerebrospinal fluids from twenty-nine patients. He finds that the cerebrospinal fluids of poliomyelitis and encephalitis show abnormal changes in practically all cases, but present no specific characteristics. Fluids from cases of encephalitis generally show a higher albumin-globulin content than do the fluids of myelitis or of the abortive cases. Fehling's solution is reduced by all fluids but not in equal degree. Examination of the spinal fluid is the most important factor in clearing up the diagnosis in abortive and preparalytic cases.

Diagnosis of Scurvy.—A. Brown (*Arch. Pediat.*, 1915, xxxii, 744) states that the absence of subperiosteal hemorrhage, as shown by Röntgen examination, does not exclude scurvy, as it has been shown that recently extravasated blood is very radiable and only when the disease is well advanced and some organization of the clot has occurred does it exhibit itself on the x-ray plate. The first definite evidence of scurvy is the appearance in the radiogram of the "white line" which precedes the occurrence of the hemorrhages and indicates an increased density at the junction of the epiphysis and diaphysis. A high temperature with a polymorphonucleosis is not incompatible with a scorbutic condition, but occurs, on the other hand, only in the severe and most advanced cases, where a faulty diagnosis of pus is apt to be made, in which cases the presence of the "white line" is a valuable aid to diagnosis. The association between scurvy, rickets, tetany and beriberi is very intimate. The production of these various ailments occurs through the improper handling of our food stuffs, altering the constituents in such a way as to com-

pletely upset proper balance of mineral salts within the organism. Why rickets is produced in one case, tetany in another and scurvy in another it is impossible to state. In rickets the loss of calcium is definite, while the evidence at hand shows that in tetany, sodium and potassium act as the irritating salts and calcium and magnesium as the sedatives. In scurvy the calcium retention is unexplained.

Mild Diabetes in Children.—D. Riesman (*Amer. Jour. Med. Sci.*, 1916, cli, 40) says that the fatality of diabetes in early life is an axiom. However, an increasing number of observations seems to show that juvenile diabetes need by no means be a mortal disease. Reporting four illustrative cases, he says that there exists a mild type of diabetes in childhood and adolescence. The disease is peculiar in its tendency to occur in several members of the same family. The glycosuria is usually moderate, although nervous excitement and other disturbing factors may augment it. Other diabetic symptoms are often slight and may be wanting. The disease is not progressive and may remain stationary or end in apparent recovery. In its general features, it corresponds to the so-called renal diabetes.

Acute Cerebellar Ataxia in Children.—J. P. C. Griffith (*Amer. Jour. Med. Sci.*, 1916, cli, 24) reports a case of acute cerebellar ataxia in a child of five years. The noteworthy features in this case were rapid development of symptoms without discoverable cause, unless possibly the child had suffered from influenza; a very uncommon degree of nystagmus; ataxia of the extremities; disturbance of sensorium; affection of speech; slight increase of reflexes, and rapid recovery, complete in one month from the onset. The symptoms on the whole point chiefly to some disorder of the cerebellum. The writer abstracts 17 cases from the literature. Analyzing these and his own case, he finds that the immediate apparent causes of the attacks are divided into scarlet fever, 2 cases; measles, 3; typhoid fever, 4; pertussis, 2; influenza, 1; poliomyelitis (?), 1; epileptiform convulsions, 1; trauma, 1; dysentery, 1; not discovered, 2. The preponderance of acute infectious diseases is very evident. Only 1 case followed trauma. Ten of the patients were boys and 8 girls. The age at the time of onset ranged from three and a half years to twelve years, 10 of the patients being six or more years of age. That the condition present is in fact dependent upon a lesion of the cerebellum is, in a way, an assumption. The complex of symptoms based upon the composite of all the cases seems sufficient, however, to warrant a belief in the cerebellar origin. Disturbances of the sensorium were present in the early states of a large number of cases. All these may be classed among the symptoms common to any severe intracranial lesion, or they might be the evidence of a complicating disturbance in other regions than the cerebellum. Some affection of mentality, apart from unconsciousness, was present in 12 instances. In most of these it was of brief duration, but in a few it persisted in some form for a longer time. In such it, of course, indicated lesions elsewhere than in the cerebellum alone. The affection of speech might with propriety be considered an extracerebellar disturbance, but certainly in some cases at least, and perhaps in most of them, seems not so much to depend upon an involvement of the centers

for speech as upon an inability to articulate properly—an ataxic condition. There is a distinct tendency to increase of the reflexes in this disorder, pointing toward the cerebellar involvement. In general it is a fair conclusion that the inability to walk or to use the arms depended upon the ataxia rather than upon paresis. The ataxia was noted in every instance; in the legs in all, in the arms it appears to have been present in all but one case. Anesthesia is mentioned in 2 instances, and more or less loss of control of the sphincters in 3. These symptoms are, of course, not cerebellar. Nystagmus is recorded in but 5 cases. Although it is probable that there exists a cerebellar nystagmus, the symptom is certainly produced by lesions of other regions as well. In seven cases entire recovery ensued. There is every reason to believe that in most instances few if any evidences of the disease remain.

Citrated Whole Milk.—E. Pritchard (*Practitioner*, 1916, xcvi, 144) believes that the "citrated whole-milk" method is physiologically unsound, because it allows no latitude for adaptation to the individual's digestive, assimilative, metabolic, and secretory activities, and that its use imposes obligatory modification of the infant. Secondly, that it affords little scope for the study of the influence of variations in the diet. Thirdly, that if the principles of percentage feeding are understood, a satisfactory food can be synthesized in a great variety of ways to satisfy the physiological requirements of any particular child; and fourthly, that dried milk, if properly modified and of good quality, has all the advantages, and few of the disadvantages, of so-called dairy milk.

Predisposition to Tuberculosis.—Paul Reckzsch (*Arch. f. Kinderheil.*, Bd. 65, Heft iii-iv, 1916) says that the known importance of an early diagnosis of tuberculosis teaches that we must begin at babyhood to seek for symptoms and signs of this disease, and continue to seek it throughout childhood and puberty if we would prevent its later ravages. The ubiquitous tubercle bacillus infects many; in some there is no evident lesion; in others the lesion remains latent, and in still others the lesion shows itself plainly and is progressive. Anatomical examinations show that these latent lesions, which have never caused any symptoms, exist in many persons. This suggests the production by these early lesions of immunity to later infections. Predisposing factors to tuberculosis are found in underfeeding, overwork and other infectious diseases. These factors may act in the parents and through them on the unborn child, even when the parents have no evident tuberculosis. The larger number of relatives in a family who have had tuberculosis the greater predisposition the child has to tuberculosis. Descendants of tuberculous parents succumb to consumption more often than descendants of normal parents. They show easy infection by other germs as well as the tuberculous germ. In large families it is found that the younger members, to whom is given less of the mother's vitality, oftener die of tuberculosis than in other families. Where we have this predisposition the children also oftener have other infections such as diphtheria and scarlet fever. If both parents have died of tuberculosis the child is more predisposed than if one only had died of the disease. The nearer the

birth of a child comes to the death of the parent the greater is the predisposition and the death rate in the children. In such families three-fourths of the deaths are from tuberculosis. Children having latent infections in the lymph system easily take other infections, especially those of the respiratory organs and convalescence is slower than in normal children.

New Means of Securing Coagulation.—Rudolph Fischl (*Arch. f. Kinderheil.*, Bd. 65, Heft iii-iv, 1916) has made a study of the possibility of securing hemostasis by the use of an extract of the lung substance applied locally to the point of hemorrhage. The experiments were made at the University Clinic of Prague and the extracts were made with the assistance of the Luitplod chemical factory in Munich. He analyzes coagulation, showing that it is due to a ferment which is contained in the organs as well as in the blood. The means he has used to produce coagulation is a cytozyme or thrombokinas obtained from the tissues, of which the lung substance is the most useful. After experimenting on the action of this substance *in vitro* and showing its coagulating power he experimented on animals and showed the same factors to be present here. He gives a careful résumé of the work done and published by various authors on this subject and then details his own experiments. During the past two years he has made use of twenty different lung extracts from dogs and other animals. The preparation was made from blood obtained from the carotid artery by means of a glass canula. He demonstrated its efficiency in causing coagulation in animals even in severe injuries of the internal organs, but it was practically impossible to obtain a sterile extract. He therefore attempted to obtain the same substance in a dry state, and fourteen different specimens of dried extracts were tested. The author concludes that we possess in the substance of the lung, whether used as a moist or a dry extract, a means of causing coagulation of blood *in vitro* and in animals. The question then came up what portion of the lung substance held this property, whether the juice, the salts, the lipoids, etc. As yet it is impossible to solve this problem. Experiments on animals have shown that it is possible to stop parenchymatous hemorrhages by means of tampons soaked in a solution of the dried lung extract and that it is difficult to pull away the coagulum thus formed. The action is very quick and permanent. By a ten-second tamponade it was possible to stop bleeding from the liver, spleen, or kidneys, and it did not recur. In a dog hemorrhage from the inferior vena cava was stopped in this manner. The author with Piffel made use of this extract as a hemostatic in ear and nasal operations, and it allowed operations hitherto impossible of accomplishment within the skull. In an eight-year-old hemophilic who had hemorrhage from the cavity from which a tooth had been drawn, and who had continued bleeding for three days in spite of all attempts at hemostasis, the hole in the alveolar process was tamponed with wadding soaked in the extract, and the flow of blood stopped almost at once. The hemorrhage did not return after removal of the cotton. The author exhorts other medical men to try this method and to report their results.

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ORIGINAL COMMUNICATIONS.

1. ADENOCARCINOMA OF THE CORPUS UTERI: NEARLY COMPLETE REMOVAL BY THE CURET.* 2. ECTOPIC CHORIOEPITHELIOMA OF THE PELVIS.

BY

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(With four illustrations.)

ADENOCARCINOMA of the body of the uterus is the most benign form of cancer encountered in the female genital tract. Various authors estimate the percentage of recurrence after operation at from 0-60 per cent.(1). Most cases, if operated on at an early stage, remain cured after simple vaginal hysterectomy, because extension to the pelvic lymphatics and the adnexa or metastatic disseminations are late and rare.

The diagnosis of carcinoma of the corpus uteri is tentatively made from the history of metrorrhagia (especially if bleeding starts up after onset of the menopause), but it must regularly be confirmed by the microscopic examination of the curetings obtained. Other clinical signs, such as increase in size of the uterus, foul discharge, large irregular cavity and bleeding upon introduction of the sound are uncertain, because small necrotic fibroids, placental rests or purely hyperfunctional changes, alone or in combination, may give quite similar symptoms.

The curetings of adenocarcinoma of the uterine body are characteristic because of the type of cell (distinguishing it from the more malignant cervical adenocarcinoma), the frequent occurrence

* Specimen presented before the N. Y. Obstetrical Society.

of several layers of cells of varying size with nuclear irregularity, and the irregular convoluted and distorted gland forms (far more marked than the premenstrual physiological changes). If, in addition to a considerable amount of curetings, invasion of the uterine wall can be demonstrated in the curetings, it is usually safe to predict that the growth is extensive and of considerable duration, because ordinarily the curet removes only the surface of the growth and does not reach the musculature unless deep and extensive erosion has occurred.



FIG. 1. -Section from voluminous curetings, showing adenocarcinoma of the corpus uteri.

On the other hand, adenocarcinoma of the uterus has been completely removed by the curet according to various authors(2), and possibly in one or two instances has been permanently cured by mere curettage (?).

The case reported below shows that such criteria, as the degree of

invasion, cannot be forecast from either the amount of material obtained grossly, or the apparent invasion of the uterine wall as seen microscopically in curetings. It furthermore shows that repeated curettage might well prove negative, unless a considerable interval elapsed between the first and second operation.

Mrs. F., was referred to me on Nov. 10, 1915, by Dr. N. B. Waller. The patient was a widow, fifty years of age, the mother of two children. For one year she had suffered from severe menorrhagia and metrorrhagia, the bleeding being continuous for the last three

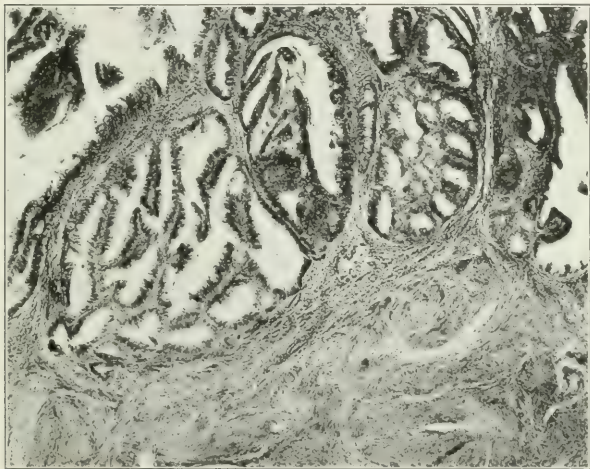


FIG. 2.—The only portion of the uterine wall found showing a small area of carcinoma (center of the picture).

months. On Nov. 6 curettage was performed by Dr. Waller. The voluminous curettings were examined by Dr. H. Celler, who reported adenocarcinoma of the corpus uteri. I personally also examined the sections, and found a papillary adenocarcinoma, which in spots became almost alveolar, and apparently invaded the stroma of the uterus (Fig. 1). From the sections I diagnosed an advanced stage of the disease.

The patient proved to be a very fat woman (more than 240 pounds), pale, but otherwise in good condition. The uterus was about the size of a two months' pregnancy, antiflexed and held rather rigidly in place by parametrial scars. In spite of the technical difficulties to be anticipated, I proceeded to perform a vaginal hysterectomy

sixteen days after the diagnostic curettage. On account of the inelasticity and friability of the parametria the vaginal route had to be abandoned and the operation was completed through an abdominal incision. Oozing proved almost uncontrollable, so that finally firm packing, led out through the vagina, reinforced by vaginal packs, placed within a ring of Ochsner clamps grasping the vaginal edges⁴ was resorted to. The pelvic peritoneum was closed and the abdomen sutured. The patient left the table in poor condition. She oozed for twenty-four hours per vaginam. The clamps were removed after forty-eight hours. A large vesicovaginal leak then at once became evident, which closed spontaneously after ten days under the use of a permanent catheter. On the tenth day mild phlebitis of the right leg developed. In spite of these numerous complications the patient recovered and is now well.

Upon opening the uterus several small intramural fibroids were found in the one cornu. The endometrium had apparently not yet regenerated. There was no erosion of the uterine wall, and upon gross examination *no evidence of carcinoma could be seen*. On the posterior wall just above the internal os, an area about 1 centimeter square appeared somewhat velvety. From this region and numerous other areas sections were cut by Dr. Thalheimer.

Fortunately for our peace of mind, a small portion of the area above the cervix microscopically showed adenocarcinoma with slight invasion of the musculature (Fig. 2). In a few adjacent spots small accumulations of cancer cells were found in the deeper lymphatics of the myometrium.

Epicrisis.—Curettage performed by another physician showed voluminous adenocarcinoma with invasion of the uterine wall. After a prolonged and difficult hysterectomy, from which the patient almost lost her life, the uterus obtained appeared to show only a few small fibroids! Only after careful search were small microscopic areas of cancer found. The case recorded above is of interest because it bridges the gap formed by such cases as were reported by Ladinski (l. c.) in which no carcinoma could be found after curettage (and in which, therefore, the question of a mistake in diagnosis or a mixing up of specimens in the laboratory, always arises). The surgeon is necessarily put upon the defensive when an organ removed for malignant disease shows no gross lesions, and should microscopic examination prove negative, as might well happen, a degree of unpleasant uncertainty remains. Perhaps this fact accounts for the rare appearance in the literature of reports of similar cases.

2. ECTOPIC CHORIOEPITHELIOMA OF THE PELVIS.

This case is instructive clinically. Because of incompleteness it is of less value to the pathologist than its rarity warrants.

Past History.—Mrs. R. A. Surg. No. 159942, was admitted to the First Gynecological Service of Mt. Sinai Hospital (Attending Gynecologist Dr. J. Brettauer) on Dec. 13, 1915, with the following history.

Aged thirty-two years, married. Menstruation began at age of fourteen years, and was regular until five months ago. Pregnancies were six in number, three children, the last four and one-half years ago, three abortions, the last one and one-fourth years ago. All abortions occurred before the second month of gestation; curettage performed after last miscarriage.

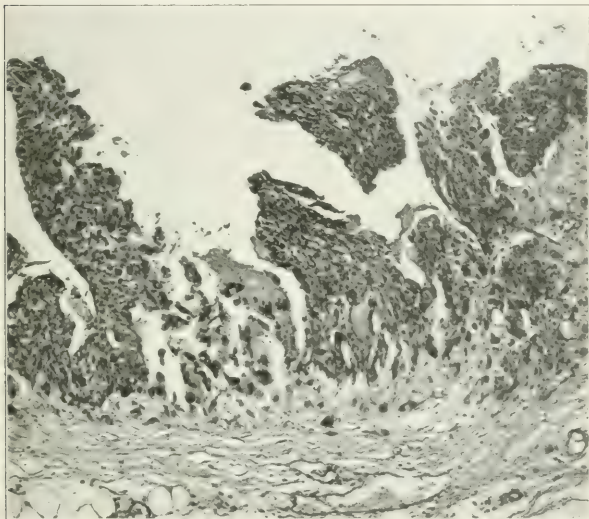


FIG. 3.—Typical chorioepithelioma invading the pelvic cellular tissue.

Present History.—For the last five months the patient's health has been poor. Her menses occurring irregularly every six to seven weeks, were moderate in amount. She complained of a moderate amount of pain in the lower abdomen and some backache. For the last two weeks she has been in bed because of malaise, pain in lower abdomen and moderate degree of fever. There has been slight pain on urination, the bowels have been constipated.

Examination.—The following abnormalities were found: Considerable emaciation, a blowing systolic murmur at the apex; tenderness in the right lower abdominal quadrant on deep palpation; a deep cervical tear, uterus enlarged and firmly fixed, behind and to

the right of it a fluctuating mass, reaching into Douglas' culdesac with upper limit undefined.

Subsequent Course.—The patient was observed for eight days, during which time the mass increased in size, and the temperature rose to 101° . Vaginal aspiration, to determine whether the mass to be dealt with was a pelvic abscess, was decided upon.

Operation.—Under anesthesia the mass was felt low down in the right fornix, the size of an orange. On aspiration through the posterior fornix pure bright blood was obtained without much suction. The fornix was at once incised, allowing exit to a solid stream of arterial blood.

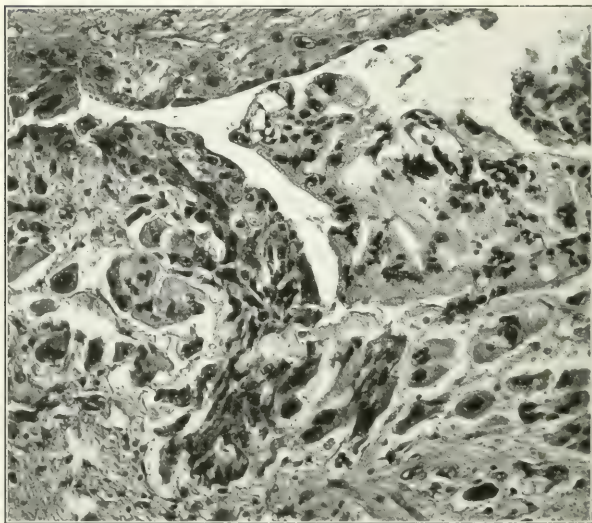


FIG. 4. —Same at higher magnification showing chorioepithelioma tissue in close proximity to a large blood-vessel.

Immediate suprapubic incision was made while an assistant exerted pressure against a big vaginal gauze tampon. Fine adhesions between sigmoid and uterus were separated. Enormous hemorrhage from the depth of the pelvis, apparently arising from the right pelvic wall, in the neighborhood of the right sacrouterine ligament, not controllable by strong pressure, was encountered. In order to open up the depths of the broad ligament widely, a rapid clamp hysterectomy and right salpingo-oophorectomy were performed. In the meanwhile pressure on the bleeding area, intra-

venous infusion of 325 of saline solution and transfusion of 312 of blood by the citrate method were resorted to to offset the uncontrollable hemorrhage.

As no spurting vessels could be seen the aorta was compressed, and a ragged area, about the size of a silver dollar, was exposed in the region where the sacrouterine ligament, ureter and division of the internal iliac vessels are situated. The tissue looked like torn placenta. As the sole means of controlling the bleeding, deeply placed chain ligatures were passed around the area. Considerable of the tissue was removed. The clamps were replaced by ligatures and the abdomen closed with through-and-through sutures.

The patient never recovered consciousness and died shortly after completion of the operation. Autopsy was refused.

Pathological Report.—The uterus was of moderate size, the endometrium normal. The right ovary and tube were, likewise normal. The tissue removed from the pelvis was reported typical chorioepithelioma. Through the courtesy of Dr. F. S. Mandlebaum, Pathologist of Mt. Sinai Hospital, the entire tissue was turned over to me. It was cut in serial sections. In no spot did villi show. Everywhere Langhans's cells and syncytium, invading the pelvic cellular tissue, appeared.

Epicrisis.—Clinically the tragic suddenness of the hemorrhage and its rapid fatal outcome are most striking. A patient prepared for the minor operation of opening a pelvic abscess was dead less than one hour after the aspiration had been begun. The pathological report, however, showed that the patient was suffering from a malignant condition.

Pathologically several interesting questions arise. The primary site of the tumor could not be found. The uterus, both macro- and microscopically was normal, and showed no decidual reaction. The right ovary and tube were likewise negative. The left ovary and tube were found grossly negative at operation and were distant from the site of the lesion.

Either primary or secondary peritoneal (abdominal) implantation of an ovum can be excluded by the fact that serial section of the invasive portion of the mass showed no villi. Etiologically one of the previous gestations must be considered. During the pregnancy fetal cells must have been carried away and deposited by the blood stream at the site found at operation. Here the chorioepithelioma had developed, small repeated hemorrhages occurring and being encapsulated in Douglas' culdesac as happens in ectopic gestation. Although the tragic outcome was hastened by the operation, death would have necessarily ensued, because radical removal of the growth could not have been accomplished.

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REPORT OF A CASE OF GENERAL EDEMA OF THE FETUS.*

BY

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New York City.

(With one illustration.)

BALLANTYNE, of Edinburgh, who has had the most experience with this interesting subject, says: "General dropsy of the fetus was the disease which in 1887 first attracted my attention to the study of antenatal pathology, and since that year I have had the extraordinary opportunity of examining eleven specimens of this malady, and have published the results of the examination of several of them. The result of all these opportunities and of all this writing is, that I now feel far less certain about the pathogenesis of this disease than I did shortly after I had examined my first specimen."

Ballantyne's definition is very good. "A morbid condition of the fetus, characterized by general anasarca, by the presence of fluid effusions in the peritoneal, pleural, and pericardial sacs, and usually by edema of the placenta, and it results in the death of the fetus or infant before, during or very soon after birth."

Ballantyne found sixty-eight cases in the literature and Schumann in a recent paper reported thirty-eight additional cases.

Schumann divides the cases in two groups: "(1) those cases in which edema is due to some mechanical or structural defect in the fetus or its membranes, and (2) those due to toxemia of the mother and secondarily of the fetus, without any morphological defect necessarily present." My case belongs to the latter class.

As to the etiology I would again quote Ballantyne: "Provisionally it may be supposed that general edema of the fetus may arise in

* Read at a meeting of the Society of Alumni of Bellevue Hospital, April 5, 1916.

the later months of fetal life, from maternal causes; possibly conditions which increase the blood pressure in the placenta by causing structural changes in the maternal and (secondarily) in its fetal parts, may thus lead to backward pressure and transudation of serum in the fetal body. Again it may be supposed that in early fetal or late embryonic periods, structural anomalies may arise in the fetus (heart, kidney, liver, blood) which will directly produce the dropsy as it is produced in the adult, although with slight modifications and exaggerations on account of the peculiarities of the intra-uterine environment. These fetal conditions it may yet be found possible to trace back again to morbid maternal states; and it may even be that maternal or paternal conditions existing in the sexual cells before impregnation may be potent to direct the life of the impregnated ovum into abnormal manifestations. Let us here leave this subject; it is clear that it is obscure; this alone is clear."

The history of this case is as follows:

Mrs. G. B. M. Referred by Dr. Henry Wolfer. Nativity, Born in U. S. of German parents. Aged thirty years, para-iii. She was last unwell January 15, 1915, was due October 22, 1915, but was delivered Aug. 24, 1915, or at about seven months.

Family History.—Father died thirteen years ago in Manhattan State Hospital of paresis. He was bedridden for the last six months. Mother is living and well, as are two brothers and one sister. One sister died when twenty-five years of age from peritonitis following a miscarriage.

Childhood Diseases.—Scarlet fever and diphtheria when eight years of age, no history of complications. Pneumonia when eleven years of age, no complications.

Menstrual History.—Began at fifteen years, regular, moderate amount, has slight pain in the back. After marriage five years ago, was somewhat irregular until after the first baby was born two years and four months later.

Obstetrical History.—One full-term child delivered by low forceps January 8, 1913. Child is living and well. She was treated with irrigations for cystitis for three months after this delivery. One full-term child delivered spontaneously August 11, 1914. This baby died about one hour after birth, but as no autopsy was performed the cause is not known. It was apparently healthy.

Present History.—Seven weeks before her admission to the hospital her abdomen enlarged rather suddenly. She became aware of this enlargement by her inability to fasten her corsets one morning. Two weeks before admission her lower extremities became edematous and she had several quite severe headaches. At times she did not see well, there was a cloud before her eyes; this would pass in a few minutes. She was also nauseated at times but did not vomit.

Ten days before admission the urine contained a moderate trace of albumin and a few granular casts. The blood pressure was

138 mm. The extremities were edematous. On the day before admission the lower extremities were markedly edematous, the abdomen was large, the uterus tense, pyramidal in outline. It was very difficult to palpate the fetus. Blood pressure, $12\frac{4}{80}$. There was no albumin in the urine.

She was admitted to the hospital August 23, 1915.

Labor.—The membranes were ruptured artificially to induce labor; sixty-five ounces of amniotic fluid escaped. The cervix was soft,



FIG. 1.

two fingers dilated. Labor progressed satisfactorily until the head reached the outlet, and as there was some delay Elliott's forceps was applied. The head was spherical and soft, it felt like a breech. It was in a L. O. P. position and was delivered transversely. There was marked dystocia caused by the enlarged body and it was delivered after rupture of the cervical ligaments and fracture of one humerus. Premature female infant weighing 8 pounds, was generally edematous, and made no attempt at respiration.

The placenta was large, thick, and edematous. It was round

25 cm. by 24.5 cm. The cord was edematous, 44 cm. long, centrally inserted. Its weight was 3 pounds 8 $\frac{1}{2}$ ounces.

Postpartum.—The patient complained of severe headache immediately after delivery and four hours later had a convulsion. She had six convulsions at intervals of about two hours, between them she was fairly clear. The usual eliminative treatment was given: croton oil \mathfrak{M} ii, colon irrigations, and one hot pack. After the last convulsion ether was given and a venesection and infusion performed. About 6 ounces of blood was withdrawn and a little over a pint of saline given.

Puerperium.—Following the infusion she made a rapid and uneventful recovery.

Urine.—On the 24th (day of the convulsions) contained 0.25 of one per cent. of albumin by Esbach, and a moderate number of granular casts. On the 27th there was a moderate trace of albumin but no casts, and on the 30th only a trace of albumin.

Wassermann reaction negative.

On October 16, 1915. She weighed 111 $\frac{9}{16}$ pounds (about her normal weight). B. P. 114 $\frac{80}{80}$. The urine was negative.

PATHOLOGICAL REPORT.*

Autopsy Notes.—Body of a well-formed but premature female infant. There is a general edema of the skin and muscles, and much straw-colored fluid in the serous cavities.

There is a wide separation of the fifth and sixth cervical vertebræ and rupture of all the spinal ligaments and spinal cord, and laceration of cervical muscle. The tissues of the neck are infiltrated with blood.

The spleen is much enlarged and smooth apparently slightly edematous.

Liver normal. Adrenals soft, and light in color. Kidneys small, pale. Lungs atelectatic. No signs of syphilis.

Anatomical Diagnosis.—The condition suggests an edema and intoxication of renal origin, primary in the mother.

Microscopical Examination.—Liver: In the greater part of this organ the liver cords appear indefinite in outline and the cells show marked granular degeneration. There is diffuse myeloidization of nearly the entire organ, maintaining the blood-forming function of fetal life. This condition suggests an early parenchymatous degeneration in the undeveloped liver of a premature infant.

Spleen: Malpighian bodies and trabecula are imperfectly developed. There is a diffuse myeloidization of the entire organ. The capillaries are dilated, and the pulp shows excessive production of myelocytes, that is a continuation of the blood-forming function, which is normal in fetal life.

Kidneys: The cortex appears poorly differentiated. The glomeruli are small and the cells of the capsule are difficult to differentiate from the cells in and on the tufts. In certain areas of the cortex the

* I am indebted to Dr. E. S. L'Esperance for the pathological report.

tubules have apparently remained of the fetal type, and have not enlarged into true glomeruli. This gives an edematous appearance to this portion of the kidney. In the medulla there is apparently an increase in interstitial tissue associated with small undeveloped tubules. The cells of the fully developed tubules are swollen and show early granular degeneration. The capillaries are dilated and contain a high percentage of myelocytes and normoblasts. The whole organ suggests the undeveloped renal structure frequently observed in a premature infant and in this case associated with early parenchymatous degeneration.

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47 EAST FIFTY-EIGHTH STREET.

A CASE OF CARCINOMA OF THE CECUM IN A GIRL TWENTY-THREE YEARS OF AGE.

BY

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(With three illustrations.)

CHANGES in the organism which are due to age are usually considered among the etiologic factors in carcinoma. It is well known that cancer may appear at birth or during early youth, yet the definite relationship of malignant proliferating processes to mature age justify the common view that carcinoma is a disease of advanced life. Schmidt of Innsbruck(1) remarks that this is a peculiarity which does not apply to a single one of the many known infectious processes and therefore serves as another argument against the parasitic theory of cancer.

It is interesting to study the gradual changing of opinion regarding the relation of age to cancer. Writers of a few generations ago while they recognized the greater frequency of cancer in the years of advanced maturity found a surprisingly large proportion of malignant neoplasms in youthful persons. Thus, sixty years ago, Walshe in 772 cases, including cancers of all kinds, found that seventy-eight of these occurred in individuals between twenty and thirty years of age, and Paget's oft-quoted table pretends to show that the ratio of cancer between the years of twenty and thirty to cancer at all ages is as one to twenty-five (circa).

Paget's book on surgical pathology was written in 1860 and although he himself makes rather clear distinction between malignant fibrous tumors with elongated caudate or oat-shaped cells and tendency to local recurrence on the one hand and malignant epithelial growths on the other, it is safe to say that not all of those who contributed to his statistics were able to make the same differentiations, confounding in all probability the sarcoma of youthful persons with carcinoma. Twenty-five years later when the histologic distinctions between sarcoma and carcinoma had become generally known, Struempell averred that "Darmkrebse kommen vorzugsweise wenn nicht ausnahmslos im höheren Alter vor."

A little later, 1895, Tillmanns spoke of carcinoma of the intestine as essentially a disease of advanced life. In the last two decades when careful microscopical examination of all neoplasms has come to be the rule in all clinics, it has been observed that although carcinoma must still be looked upon as a disease of mature age, nevertheless extreme youth does not preclude the possibility of cancer, for example of the intestines, even in children.

Garrod (quoted by Levings in his book on tumors) reported a case of carcinoma of the sigmoid in a girl of twelve and Czerny a similar case at thirteen.

Nothnagel observed a carcinoma of the cecum in a boy of twelve and Schoning, two cases of rectal carcinoma in girls seventeen and eighteen years of age. Levings resected the rectum in a girl of twenty-two for carcinoma and quotes Clas as having noted a similar case in a boy aged three years, but unfortunately he gives no references.

The theory of Thiersch, who presupposes a disturbance of the equilibrium between epithelium and connective tissue as a predisposing factor in the etiology of carcinoma, is based upon his view of the unequally rapid aging of these two different tissues. Schmidt assumes "that in more advanced age, under the influence of local circulatory disturbance, cell-complexes may at times degenerate, thereby losing their higher characteristic properties, instead of which there comes to the fore, unhindered, a tendency—corresponding to an elementary function—to multiply." Long-continued alterations in the metabolic processes are probably also related to the genesis of carcinoma.

Concerning the origin of carcinoma of the large intestine, Ribbert⁽²⁾ denies the possibility of the development of cancer in normal mucous membrane. Such malignant epithelial neoplasms always arise in a mucous membrane: (a) changed by polypoid growth, or

(b) in areas altered by inflammation, or (c) from detached epithelial rests.

Wechselmann emphasizes the important relationship of polyposis of the colon to carcinoma. Verse, quoted by Ribbert (*ibid.*), found twenty-two cases of polyposis of the colon associated with carcinoma. He observed, however, two additional cases in which polyps were in the colon while the carcinoma was in the small intestine. Others, including Quenu, Landel, Tanberg and Hart have found polyposis in association with carcinoma.

Cancer of the cecum in a girl of twenty-three is of interest not merely because of the academic fact of the rarity of the condition alone but also for practical reasons concerning diagnosis and treatment because of the possible confusion in differential diagnosis owing to the prejudice against the assumption of the presence of carcinoma in one so young.

AUTHOR'S CASE.

Family History.—There had been no dyscrasias in the family, no malignant neoplasms, no lues, and tuberculosis. Both parents are living. A younger sister had passed through a severe attack of appendicitis with abscess formation and spontaneous rupture into the bowel; apparent recovery without operation.

Personal History.—Patient had always enjoyed average health but had always been slender with somewhat subnormal musculature. She had escaped the severer infectious diseases of childhood. She was a stomach weakling and accustomed to take only easily digestible food.

History of Present Illness.—Patient had suffered for about six weeks with what had been diagnosticated chronic appendicitis. Anorexia and nausea had been present and considerable difficulty had been experienced in preventing fecal stagnation. The temperature had hovered at about 100 and the pulse about 110. There had been a loss in weight of about 5 kilograms. On two occasions, one about ten days before operation and the other two days before operation, fresh blood was discharged by the bowel.

Status Præsens.—Patient was pale. The musculature was flabby; the tongue was coated and the breath offensive, the temperature 99 and the pulse 110, respirations normal. There was a tender mass at the site of the cecum. It was found by palpation over the thin abdominal parietes to be rough and angulated and in size about 10 cm. in each dimension. It was movable.

Operation.—The abdomen was opened by a right pararectal incision and the tumor exposed. It extended upward from the ileocecal valve on the inner side of the ascending colon. There was no involvement of lymph nodes. It was considered that the growth might be a simple inflammatory tumor such as is not rare in the

cecal wall. But what with the history of hemorrhage and the angulated surface of the growth it was believed to be carcinoma, therefore, the terminal ileum, the cecum and nearly all of the ascending colon were removed and an ileocolostomy made at the hepatic flexure.

Gross Appearance of Tumor.—The appearance of the neoplasm in the gross after being split suggested carcinoma in so much as it was nonencapsulated and infiltrating in character and quite hard. Enlarged lymph nodes were present.

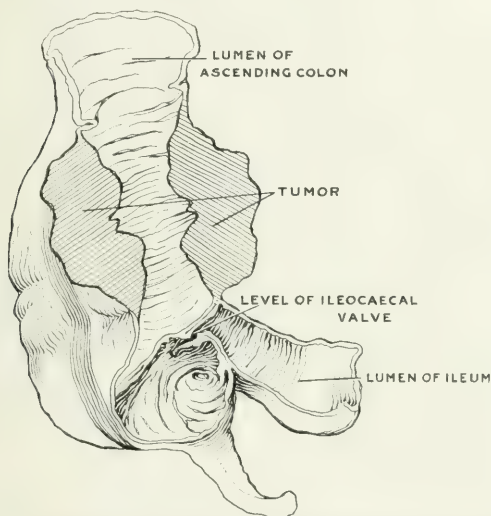


FIG. 1.—Diagram showing location of infiltration growth in wall of cecum and ascending colon.

Microscopical Examination.—Dr. H. R. Alburger, former Professor of Pathology in the Indiana University School of Medicine, reported the following: "The cecal wall is densely infiltrated with a new growth of apparently epithelial origin which is invading the connective tissue and even the postperitoneal fat. The growth consists of large irregular cells without appreciable intercellular substance arranged in irregular columns with conspicuous endothelial lined spaces between them. The cells have round, oval and irregular nuclei, many of which are vesicular. Some contain included cells of lymphoid type and there is a dense peripheral infiltration of lymphocytes about the areas invaded. The picture is one which so closely reproduces that seen in carcinoma of the mammary gland

that we are of the opinion that the cells are of epithelial rather than endothelial origin. Diagnosis: Carcinoma of the cecum.

Dr. V. H. Moon, Professor of Pathology in the Indiana University School of Medicine, also made sections of the tumor and states that it is unquestionably carcinoma.

The gross specimen was sent to Dr. Joseph Colt Bloodgood of Johns Hopkins University who reports as follows:

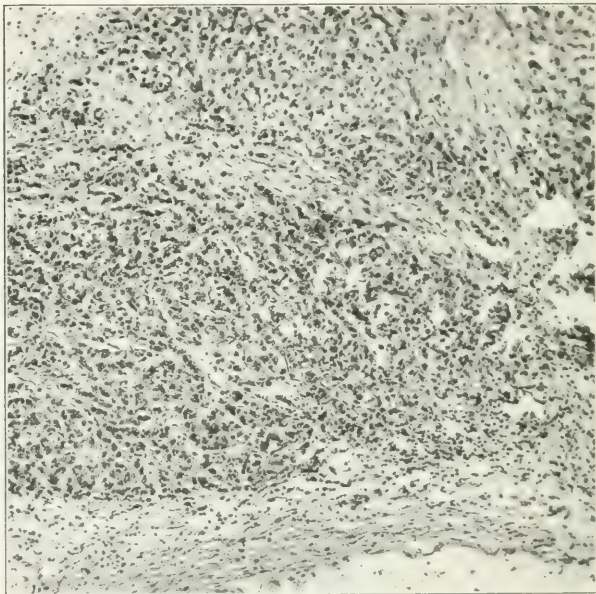


FIG. 2. —Low-power photomicrograph of neoplasm shown in Fig. 1, $\frac{2}{3}$ obj. (Shapiro, Baltimore).

Microscopic Study:

SECTION I.—Tumor. Alveoli of cells of the glandular type. Size of alveoli vary. Almost everywhere these glandular cells are producing mucoid or colloid material. The tumor beneath the cells has infiltration of lymphoid cells of various types. Diagnosis, colloid cancer.

SECTION II.—Adjacent gland, which in the gross seemed to be involved. This shows that this gland has at one side an area of colloid cancer.

SECTION III.—Gland near tumor, in the gross apparently involved. Under microscope, no evidence of cancer.

SECTION IV.—Glands at some distance from tumor in cecum. No evidence of metastasis.

SECTION V.—Described as a polyp-like mass at the base of the tumor. This shows colloid cancer and a bit of mucous membrane of the cecum. The mucous gland is slightly hypertrophied and shows the tumor had broken through mucous membrane.

SECTION VI.—Base of appendix—shows walls slightly thickened, no infiltration with cancer.

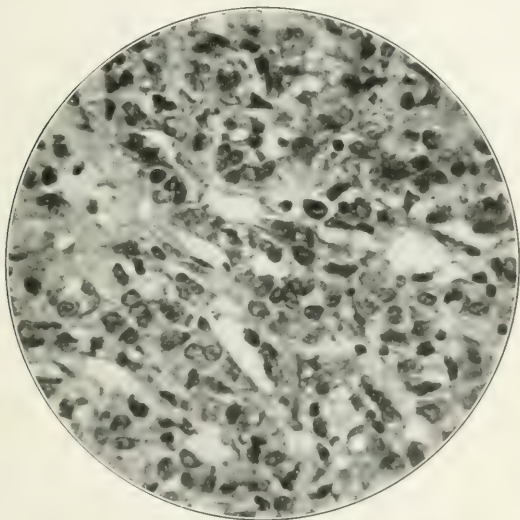


FIG. 3.—High power photomicrograph of carcinoma of cecum and ascending colon, $\frac{1}{6}$ obj. (Shapiro, Baltimore).

SECTION VII.—From tumor showing necrotic areas. This section is similar to Section I and in addition we see on the surface of the tumor mucous membrane with hypertrophied mucous glands. The areas of necrosis are apparently areas of the tumor in which the cancer cells have disappeared, leaving a slightly eosin staining connective tissue with here and there lymphocytes. Apparently this is an indication of nature's attempt at the distribution of the tumor cells we frequently find in colloid cancer but apparently it was never able to destroy the entire center.

The tumor itself had various differential staining. The Mallory's

stain shows that the connective tissue is rather scanty and the tumor is very cellular.

The Van Gieson's Stain.—The stroma stains red and the cells rather brown. This brings out the structure better than eosin and hemotoxylin, but does not show the colloid material as well.

The Safranin Stain.—The differentiation is not as distinct. The colloid does not take the stain.

With iron and hemotoxylin we also get a good differentiation. These sections show numerous areas in which the cancer cells have disappeared.

Postoperative History.—The operation was made on October 12, 1915, since which time there has been no clinical evidence of recurrence. There are no symptoms of obstruction, no tumor is palpable. The patient has gained steadily in weight.

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CONGENITAL AND ACQUIRED RETROPOSITIONS OF THE UTERUS: THEIR DIFFERENTIATION AND RELATIVE SIGNIFICANCE.*

BY

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(With seven illustrations.)

APPROXIMATELY 18 per cent. of all gynecological patients present a retrodisplaced uterus.

Barbour and Watson estimate one fifth of this number as congenital in origin, qualifying their statement however by admitting that: "It is difficult to establish the congenital nature of these cases, but should a uterus be found retroverted in a nulliparous patient, without any history of inflammation or other cause sufficient to produce retroversion, should it measure only $2\frac{1}{2}$ inches by sound and on being replaced show a tendency to resume its retroverted poise, we are justified in assuming that it has developed in that position."

These admittedly vague differential criteria, embody in their

* Presented before the Gynecological Section, N. Y. Academy of Medicine, April 25, 1916.

very paucity, the crux of the clinical problem presented by uterine displacements in general to-day.

In the first place, a retrodeviated uterus, whether in a nulliparous or multiparous patient, "without evidence of inflammation or other cause sufficient to produce the displacement," would be classified according to prevailing clinical custom as a simple or uncomplicated malposition, regardless of its probable congenital nature.

Such classification has a most significant therapeutic bearing, for, accepting the axiomatic postulate, that all *uncomplicated* uterine retrodisplacements are devoid of symptoms or clinical significance, it follows, that to differentiate the congenital from the acquired retrodisplacements, is to exclude any attempt at correction of the displacement as such in over one-fifth of the cases.

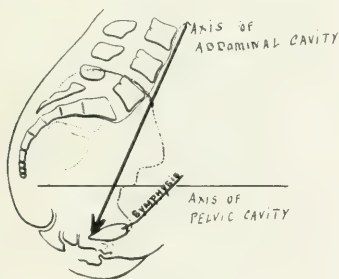


FIG. 1.

On the other hand, a congenitally retrodisplaced uterus is not necessarily "nulliparous," nor immune to—"inflammatory and other complications capable of producing retroversion," it may, like any other uterus, measure more than "2½ inches by sound," so that the congenital origin of its retroposition must be established through existing pathognomonic factors, that are constant and remain unaltered by complicating elements which tend to efface the characterizing syndrome formulated by Barbour and Watson.

As a matter of fact, it is that very class of patients, with their congenital deviations obscured by superposed parturitional and infectious complications, in which differentiation is most essential.

In seeking to establish such a constant pathognomonic factor, it is necessary to recognize, that the malposition does *not* represent simply a congenital uterine retroversion, but a congenital retro-

version of the *entire pelvis*, with resultant *compensatory* dystopia of its contents.

Dickinson and Truslow characterize the general skeletal poise of these cases as "the Gorilla type," in which—"the pelvis is rolled or rotated backward and downward, the plane of its inlet

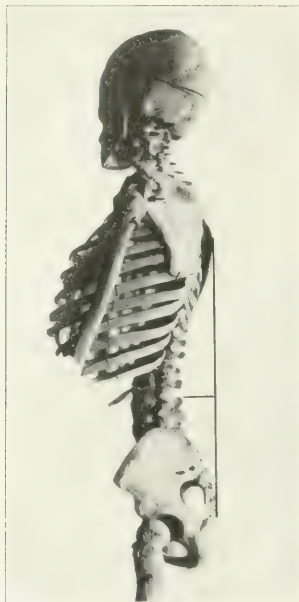


FIG. 2.—The depth of the lumbar hollow presents the relative measure of the sacrovertebral angle, and the degree of sacrovertebral angulation determines the dip of the pelvis.

making with the horizon an angle more acute than that of the normal type."

In other words, with normal spinal contours, the axes of the abdominal and pelvic cavities form almost a right angle, while in the stature under consideration, there is a marked flattening of the sacrovertebral angle, resulting in an approximation of these axes toward the vertical, so that the thrust of intraabdominal pressure is expended in a more direct line on the pelvic viscera.

This flattening of the sacrovertebral angle, is regularly evidenced by a corresponding obliteration of the normal lumbar curve and the measure of its resultant approximation to the vertical, constitutes a pathognomonic index in differentiating congenital from acquired retrodisplacements of the uterus.

To obtain this measure, the patient with back exposed, assumes her natural standing attitude, while the edge of an ordinary 18-inch desk ruler, held vertically in contact with the most prominent spinous processes of the dorsal and sacral convexities, spans the intervening lumbar hollow.

The distance in millimeters, from the deepest point of this hollow to the edge of the ruler presents our index.

The spinous processes of the dorsal and sacral convexities, are invariably and distinctly palpable under all degrees of adiposity and statural deviations, while the extreme simplicity of the method and means enables any one to substantiate the uniform accuracy of the index and elicit the significance and indications of its clinical bearings.

In an extensive series of observations, the index ranged from 12 to 45 millimeters: an excess of 45 millimeters indicates pathological lordosis, a condition the opposite to that under consideration, of more obstetric and less gynecological importance.

An index of 30 millimeters, marks the extreme minimum compatible with normal *anteversion* of the uterus: *from 25 millimeters down, the existence of congenital retroversion, may be positively predicated in nearly every case prior to its bimanual verification and this, regardless of multiparity and the other complicating factors that obliterate the differentiating criteria formulated by Barbour and Watson.*

A uterus congenitally retroverted before conception, will invariably resume its retroverted position after delivery, when the demonstration of a minus index will reveal the congenital nature of the displacement to the exoneration of the accoucheur.

The application of the lumbar index will establish over one-half of all retroversions, complicated and uncomplicated as congenital, instead of one-fifth as hitherto accepted.

The rare exceptions to the rule will, on closer investigation, reveal an exostosis of the sacral promontory; a recession of the pubes which foreshortens the conjugate diameter; a strained and deceptive pose assumed by the patient during measurement or an *acquired anteversion* from pathological concomitants: for it is only reasonable to suppose, that, just as a normally poised uterus

may become retroverted, so a congenitally retroverted one may become anteverted without invalidating the utility of the index.

It must be emphasized, that congenital retroversion as such, is essentially only a part of a compensatory adaptation of the pelvic contents, to abnormal static conditions through unstable spinal poise; that the depth of the lumbar hollow is the relative measure of the sacrovertebral angle; that the degree of sacrovertebral angulation determines the dip of the pelvis and that a certain degree of such pelvic dip is essential to the normal topography of its contents.

It is a fundamental law in dynamics, that the direction of a given force or body impelled by such force, impinging against a resistant

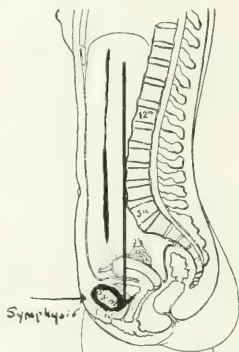


FIG. 3.—In an abdominal cavity of normal skeletal configuration a true vertical in contact with the sacrolumbar angulation will impinge against the inner face of the symphysis pubis at its lower border. This vertical represents the initial direction of intraabdominal pressure at the pelvic brim.

plane, becomes deflected in a fixed and definite manner, the degree of deflection being governed by the angle of the resisting plane.

This law finds familiar exemplification in the mechanism of labor, when the initial direction of the expulsive force becomes deflected by the pelvic planes, impelling the fetus through the devious axes of the parturient channel.

The same law governs in establishing and maintaining visceral equilibrium against the displacing force of gravity and intra-abdominal pressure; but for the influence of deflecting planes, every erect biped would prolapse his abdominal contents into the pelvis from which they must eventually extrude.

In an abdominal cavity of normal skeletal configuration, a true vertical, in contact with the sacrovertebral promontory, will impinge against the inner face of the symphysis pubes at its lower border, the sacrovertebral promontory is situated $3\frac{1}{2}$ inches above the symphysis, so that, the vertical line representing

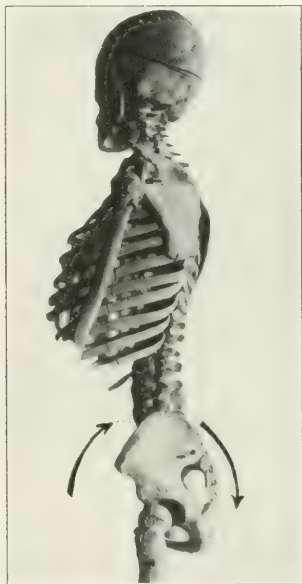


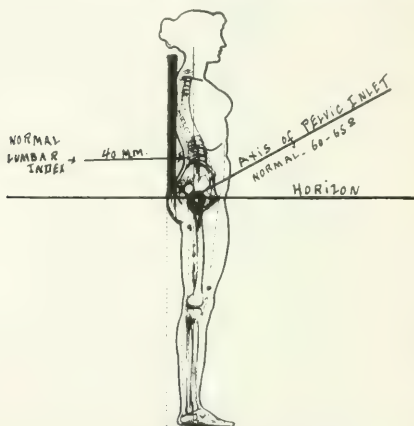
FIG. 4.—Upward and backward rotation of the pelvis elevates the pubes and lowers the sacrum, which latter thus forms the posterior instead of the upper wall of the pelvic cavity, altering the direction of the sacro-uterine ligaments—their horizontal pull tending to hold the uterus *backward* instead of suspending it from above.

the initial direction of intraabdominal pressure at the pelvic brim, passes over and not into the pelvic cavity.

In other words, the posterior abdominal wall terminating at the sacrovertebral angle is $3\frac{1}{2}$ inches shorter than the anterior, which ends at the symphysis pubes; dynamically the pelvic cavity thus presents a separate communicating chamber or elbow, hollowed out of the posterior abdominal wall, with the sacrum as an inclined

roof, from which the uterus is suspended by its sacrouterine ligaments. The inclined sacral surface deflects intraabdominal pressure, just as it deflects the presenting fetal pole during labor.

Omitting all further consideration of the reciprocal and harmonious deflections exercised by the pelvic floor musculature, and the uterus with its ligamentous extensions, the details of which are fully elaborated in my previous publications, it will suffice here to state, that normal deflection reduces an intraabdominal pressure of 80 millimeters at the pelvic brim, to 60 millimeters at the cervix, 40 millimeters in the vagina and 20 millimeters at the vulvar



Normal or neutral type of posture. Distinguishing features are: (1) line of gravity of body passes through important pivotal points; (2) the pelvis is balanced in equilibrium on the heads of the thigh bones; (3) this relation of important pivotal points with the line of gravity and this balance of the pelvis prevents muscle and ligament strains, and (4) the rear perpendicular touches the middle back and the buttocks.

FIG. 5.—Modified from Dickinson and Truslow.

outlet: the resultant intrapelvic pressure thus resembles a placid pool at the edge of a whirling current.

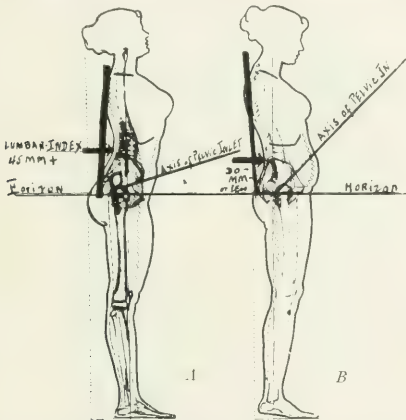
G. H. Noble corroborates these findings and Dr. J. R. Goffe states that: "It was not till I read Dr. Sturmdorf's paper, that I realized the wide application of the principle of deflecting planes both as a retentive and expulsive element."

Accepting the principle of deflection as fundamentally applicable to our problem, it follows, that every deviation from the normal in the angle of the deflecting surfaces presented by the symphysis and sacrum, must induce a corresponding deviation in the direction of

intraabdominal pressure with resulting visceral displacement or, to put it tersely, every abnormal pelvic tilt must create a correspondingly abnormal uterine tilt.

A flat sacrolumbar angle with vertical pelvis is normal in early childhood, but abnormal in the adult.

If an infant be placed on its back and its legs be drawn down from their habitual attitude of semiflexion, it will be noticed, that the range of extension is limited by the absence of the lumbar curve and pelvic incline: when gain in muscular development enables the



A.—Kangaroo type of posture. Distinguishing features are: (1) Most pivotal structures of the trunk are carried in front of and those of the lower extremities behind the line of gravity; (2) the pelvis rotates forward downward; (3) the forward carried trunk puts strain on the spinal and pelvospinal ligaments and muscles and tends toward forward displacement of abdominal and pelvic viscera. Wavy lines indicate muscles relaxed, double lines show muscles in action.

B.—Gorilla type of posture. Distinguishing features are: (1) Most of the pivotal structures of the trunk are carried back of and those of the lower extremities in front of the line of gravity; (2) the pelvis rotates backward downward; (3) the backward carried trunk puts its own variety of strain on the spinal and pelvospinal ligaments and muscles and tends toward backward and downward displacement of the abdominal and pelvic viscera. Wavy lines indicate muscles relaxed; double lines, those in action.

FIG. 6.—Modified from Dickinson and Truslow.

infant to stand, the erector spinæ draws the trunk upward against the resistance of the iliopsoas group and ligaments of the hip-joint, bending the lumbar spine into its physiological curve.

In other words, under normal development, the erect attitude is attained by flexure of the lumbar spine, the pelvis maintaining an incline of sixty to sixty-five degrees, the tip of the coccyx being on a level with the lower border of the symphysis pubes: under abnormal developmental conditions, the upright pose is induced principally

by an upward and backward rotation of the pelvis on the hip-joints, carrying the axis of its inlet toward a vertical from a horizontal line.

In such a vertical pelvis, the only tenable position for the uterus is one of retroversion.

The upward and backward rotation of the pelvis, elevates the pubes and lowers the sacrum, which latter, thus forming the posterior instead of the upper wall of the pelvic cavity, necessarily alters the mechanism of the sacrouterine ligaments, their horizontal pull tending to hold the uterus backward against the depressed sacrum,

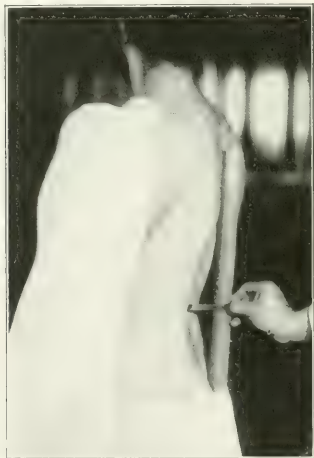


FIG. 7.—The edge of an eighteen inch ruler held vertically in contact with the most prominent spinous processes of the dorsal and sacral convexities spans the lumbar hollow. The distance in millimeters from the deepest point of the hollow to the edge of the ruler presents the "lumbar index".

instead of suspending it from above as in the normal. Furthermore, intraabdominal pressure, inadequately deflected, thrusts the loose intestinal coils into the pelvic cavity and against the anterior surface of the uterus, crowding it into the space of least resistance offered by the sacral hollow.

The whole clinical import of congenital retroversions is centered in their intra- and extrapelvic complications, not in the uterine displacement as such.

The continuous attitudinal strain on the sacroiliac joints, the

erector spinæ and iliopsoas muscles, induces pelvic symptoms, that simulate and are generally attributed to the retroversion.

Operative gynecology to date, records over one hundred detailed methods for the correction of uterine retrodisplacements, every one of these methods, at the hands of its promulgator, will undoubtedly convert the retroposed into an anteroposed uterus; but notwithstanding their faultless uterine poise, many of these patients will continue to suffer as before operation—and some more so.

Baldy states: "In my opinion nine-tenths of the operations performed on women for retrodisplacements are uncalled for—and further, the possible number of retrodisplacement operations performed in this country is limited only by the number of females in existence."

We have already stated, that congenital retroversion is a compensatory necessity and it follows that any procedure, which converts such a retroversion into an anteversion, converts a compensated into a decompensated visceral equilibrium within the pelvic cavity.

Clinically, the lumbar index will reveal two classes of congenital retrodisplacements, namely—the complicated and the uncomplicated.

Leaving the retroversion as such unmolested, the gynecologist should aim to eradicate all coexisting intrapelvic complications, thus converting the complicated into an uncomplicated case.

It cannot be overemphasized, that patients with uncomplicated congenital retroversion, suffer through a constant attitudinal strain in maintaining their unstable skeletal poise within the lines of gravity, the congenital retrodisplacement of the uterus, in contrast to the acquired form, being an accompaniment and not a cause of the suffering.

These cases must be treated on purely mechanical and orthopedic principles, the details of which find full elaboration in the appended literature; during and complementary to the general orthopedic measures, a properly molded pessary, inserted—not with the object of *anteverting the uterus*, but to act as an artificial ledge at the deficient sacral promontory in the deflection of intraabdominal pressure—will afford much relief during the necessarily prolonged period of mechanical treatment.

Our fundamental conceptions of uterine poise, normal and abnormal, have not as yet attained to any concrete finality and barring the occasional allusion to the existence of congenital retrodisplacements and their probable dependence upon conditions of

general visceroptosis, the clinical significance of such displacements, and their diagnostic, etiologic and therapeutic contrast to the acquired form, find no elucidation in the literature of the subject.

The wide diversity in the nature of the two conditions, presenting practically identical symptoms, demands their clinical differentiation—such differentiation necessitates a differentiating factor of pathognomonic constancy.

I know of none that fulfills this essential requirement, aside of the lumbar index depicted above, which, for its simplicity, facility and approximate accuracy, should constitute a routine part of every gynecological examination.

51 WEST SEVENTY-FOURTH STREET.

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AN INTERESTING CASE OF SYNCYTIOMA MALIGNUM.

BY

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(With four illustrations.)

MRS. T. I., forty-five years of age, father died of cancer of the stomach, mother still living and in good health.

History.—Puberty at eighteen; menstruation very regular, lasting one week, considerable quantity with no pain. Marriage at eighteen. Three pregnancies, all normal. One abortion at three months, about two years ago. The last menstruation unknown.

History of Present Illness.—About one year ago from no accountable cause a considerable hemorrhage occurred, accompanied by pain in the abdomen and extending into the right lower limb. These hemorrhages continued through the year, lasting for a period of one month each, with an interval of twenty days between. As the hemorrhage increased, the patient was curretted at a certain hospital with no effect, and was then brought to the clinic.

Status.—The patient was thin and anemic, no change in the lungs, the heart showed no other abnormal signs than an anemic souffle. The liver was not palpable, and the kidneys not enlarged. The vaginal examination showed that the uterus was retroverted and at the right side, but entirely isolated, a tumor the size of a goose-egg was felt.

The surface of the tumor was rough and showed pulsation. Applying the stethoscope to this part of abdominal wall a high souffle was audible. The parametrium of the same side was a little infiltrated. The uterus was normal size and had no extraordinary signs.

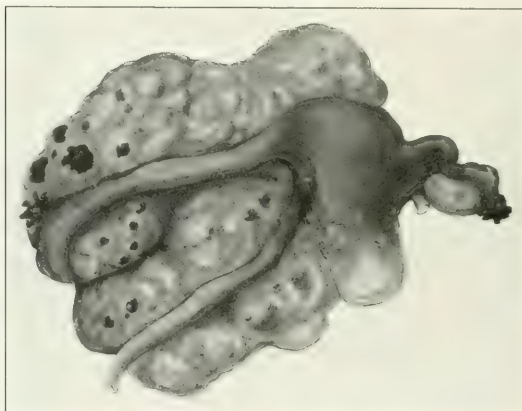
Diagnosis.—Suspecting that the tumor might be an aneurysm of the iliac vessels or sarcoma ovarii (which has abundant vessels) the patient was accepted in the clinic. As the tumor increased in size the debility increased in proportion. When pressed upon the pain extended into both the lower limbs and the anal region. Patient daily lost appetite and became unable to sleep, and at the last greatly emaciated. Death shortly followed. The topographical necropsy showed that the tumor adhered closely to the bowel and the soft parts of the right pelvic wall. The tumor with all the internal genitals taken out is shown in the figure given below.

Specimen.—The tumor is ovoid and the size of a child's head, located right behind the uterus and the surface rough.

From the anatomical relations it is evident that the right ovary itself became a part of the tumor, because the ovary of that side is nowhere to be found.

The tumor mass substitutes about half of the right uterus wall. Upon closer investigation the knots mentioned below extend to the tumor substance itself. The tumor has a thin capsule which, in places, can be stripped off easily. On cutting, the cut surface is mottled red and brown. The tumor is nearly solid, but has numerous cystic spaces of different sizes containing coagulated blood. The tissue itself is very brittle. The tube belonging to the right ovary extends over the tumor, and is very much enlarged, 16 cm. in length, and occluded, but not densely adhered to the tumor. The fimbriæ have no remarkable changes except a little edema. The appendages of the other side are not at all changed, not occluded.

Uterus.—A little enlarged, normal shaped and consistent except where substituted with tumor masses, but on the cut surface of the



. FIG. 1.—Showing relation of tumor to uterus and tubes.

median line we see in the upper part of the posterior wall two ovoid pea-sized knots, close to each other. One is relatively white, the other a dirty gray color. Likewise in the upper part of the anterior wall are two very small white-colored knots close to each other. The distance of the former knots from the top of the cavum uteri is about 1 cm. (the entire thickness of the posterior wall 1.8 cm.). The distance of the latter knots from the same place is about 1 cm. (the entire thickness of the anterior wall 1.6 cm.). Mucosa uteri shows no macroscopical changes. In the anterior lip of the cervix a knot the size of a pea is found in the submucous layer. The mucous membrane just above the knot is slightly brown in color. Otherwise no considerable changes. The vagina shows no peculiarities.

Microscopic Examination.—(1) *Tumor.*—The capsule of the tumor is very thin and consists of parallel connective-tissue fibers. The

capsule sends a few thin strands of connective tissue into the substance of the tumor, but they are very slender and are lost almost immediately below the surface. A great number of blood-vessels are seen in this connective tissue and are filled with fresh blood. The greater part of the tumor consists of coagulated blood. No healthy ovarian tissue is to be found. Tumor elements are syncytial masses and Langhans's cells. The areas between the groups of tumor cells are occupied with degenerated protoplasmic masses, fibrin and polymorphonuclear leukocytes. Many veins are stopped with tumor cells. The typical syncytial masses and Langhans's cells, the extensive hemorrhages and necrotic areas left no doubt about the diagnosis *Choriocpithelioma malignum*.

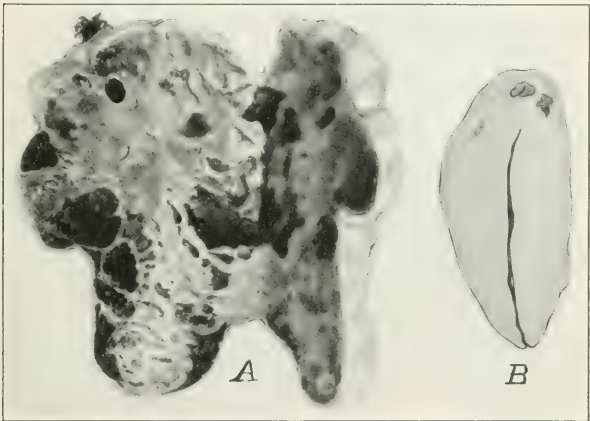


FIG. 2.—A. Cut surface of the tumor. B. Cut surface of the uterus.

(2) *Tube*.—Extending over the tumor. Blocks taken from several parts are free from tumor or other remarkable pathological conditions, except the extensive and intensive infiltration of leukocytes. No decidual reaction.

(3) *Appendages of the Other Side*.—No pathological findings.

(4) *Uterus*.—The knots in the muscle tissue show the same microscopical appearances, except that in the necrotic parts there are seen some capillary vessels and fibroblasts. Some of the smaller veins are stopped with tumor elements. The mucosa uteri shows no pathological signs, no decidual reactions.

From the above mentioned facts I think the syncytial knots in the uterine wall are primary, from which the tumor was formed. The tumor elements were transported from the interstitial knots through

the vessels (these are stopped with tumor cells and lead to the tumor) into the vein plexus of the right parametrium. It is conceivable that in this network of vessels the elements of the tumor might be caught very easily and here propagate. And at the same time the tumor elements may have been transported to the right ovary and the ovarian tumor formed. As above mentioned the tumor was, in

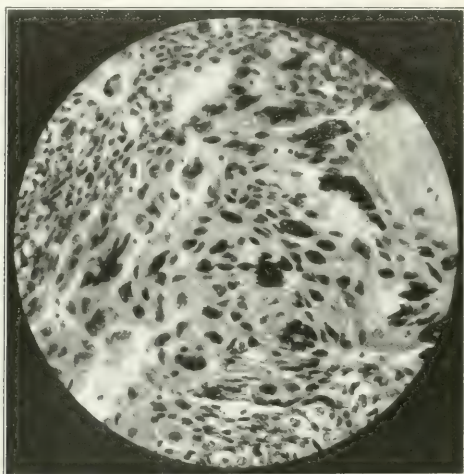


FIG. 3.—Tumor elements.

the beginning of the clinical course, right behind the uterus, entirely isolated, the size of a goose egg, and the parametrium of the same side a little infiltrated. So the transported tumor cells in the two different parts (in the vein plexus and the ovary) were gradually propagated and finally melted into each other making a definite tumor.

NOTES ON THE PROTECTIVE ACTION OF HIGH CARBOHYDRATE DIET AND OXYGEN UPON THE LIVER CELLS IN EXPERIMENTAL CHLOROFORM POISONING, WITH ITS POSSIBLE APPLICATION IN PRE-ECLAMPTIC TOXEMIA.*

BY

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(With eleven illustrations.)

It has been known for many years that chloroform poisoning produces a lesion of the liver similar to that found in certain cases of eclampsia. In 1909 Howland and Richards produced this typical lesion in dogs. The lesion consists primarily of a central necrosis of the liver lobule with a fatty degeneration extending with diminishing intensity toward the periphery of the lobule. So similar was this lesion to that found in certain cases of eclampsia that Cragin and Hull felt that the administration of chloroform to patients suffering from pre-eclamptic toxemia or eclampsia might aggravate the possibly existing liver lesion. Dr. Cragin guided by this supposition found that under the use of chloroform in delivering toxemic women at the Sloane Hospital for Women, New York City, there were fifty cases of eclampsia in 5264 deliveries whereas under the use of ether there were fifty cases in 6863 deliveries, "suggesting at least the possibility that chloroform in some cases so increased the liver lesion as to increase the number of those having convulsions. The mortality with chloroform used was 30 per cent. as against a 12 per cent. mortality with the use of ether.

The central position of this lesion has always seemed remarkable and has raised the insistent question, why should the central cells show change before the peripheral? In fact if the toxic substance enters the lobule by way of the portal vein and the hepatic artery why should not the first cells attacked be the first cells to show

* From the laboratory of the department of Obstetrics and Gynecology University of Minnesota. Read before the Minnesota Pathological Society, March 21, 1916.

change? If the cells making up the liver cords are similar structurally and functionally at the center and at the periphery of the lobule then to account for the central change we must postulate that some change takes in the blood in its sinusoidal passage from the periphery to the center of the lobule which so influences the central cells as to render them more vulnerable to the attacking toxic substance. From a broad chemico-physiological standpoint the most probable changes would be a diminution in oxygen and carbohydrate content. If the diminution in oxygen and carbohydrate content could render the central cells more vulnerable to attack the therapeutic value of oxygen and carbohydrate administration naturally suggests itself.

With this inference in view, before laying out my experiments I reviewed the literature of experimental chloroform poisoning and found that Opie and Alford in the *Journal of the American Medical Association*, March 21, 1914 has published a work which seemed to bear out this theory so far as the carbohydrates were concerned. Opie and Alford showed that if rats were given a dose of chloroform known to produce the typical liver lesion and death, if one group were placed upon a high carbohydrate diet, another on a high proteid diet, and a third on a fat diet, the average length of life of the animals of the carbohydrate group was four and two-third days, the proteid group three days and the fat group one and four-fifth days. Microscopic examination of the livers of those having received the carbohydrate-high diet, in this case oatmeal and cane sugar, showed a central lesion of one-fourth to one-third the total radius of the lobule, whereas the livers of the animals having received meat and fat showed as much as four-fifth degeneration. This suggested to them the protective action of carbohydrates and they considered that carbohydrates might be found to influence favorably the course of the pathological conditions caused by chloroform and pregnancy whereas fat might cause grave trouble. In another series of experiments they showed that carbohydrates and proteids were more protective than carbohydrates and fats.

I have repeated the experiments of Opie and Alford following their outline as nearly as possible and although varying slightly in results, no doubt because of slight variance in chloroform dosage, diet and general conditions, the results were practically the same.

Twelve rats were used: four suet-fed, four meat-fed, four oatmeal and cane sugar. Mixture of one part chloroform and two parts petroleum liq., administered to rats subcutaneously. Dosage 1 c.c. to every 100 gm. in weight. Suet-fed rats died in average of two and two-third days. Only one of the meat-fed rats died. All

of the oatmeal and cane-sugar rats lived. General appearance and actions of the oatmeal- and sugar-fed rats better than meat and fat-fed rats. This difference was most markedly apparent between the oatmeal- and sugar-fed rats and the fat-fed rats.

Comparison of the livers of the rats that died showed about same extent of necrosis, namely, one-half of the lobule. Two controls on a high carbohydrate diet showed slightly less necrosis but not as appreciable as in the experiments of Opie and Alford, but the higher percentage of carbohydrate rats living would lead one to postulate a less severe lesion. At the end of fourteen days I compared the livers of the surviving rats and found no central necrosis. Complete regeneration had taken place. Whipple and Sperry showed this regeneration beautifully in their article appearing in the *Johns Hopkins Bulletin*, 1909.

One rat fed on cane sugar alone died on the fifteenth day and showed no central necrosis. This rat survived the chloroform poisoning but starved to death. The nitrogen equilibrium must be maintained.

These experiments suggest the advisability of a diet high in carbohydrates and low in fats and proteids but high enough in proteid constituents to sustain nitrogen equilibrium.

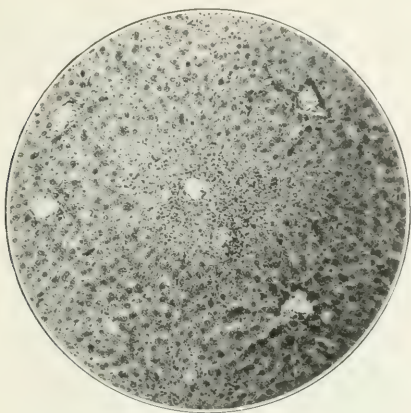
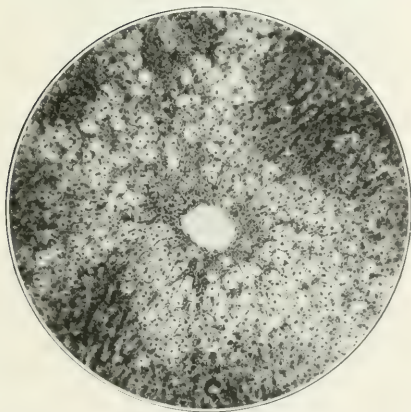
Recognizing, but waiving until proved, the possible incorrectness of the inference that a therapeutic protective of aid in chloroform poisoning might prove of equal value in those cases of toxemia and eclampsia sometimes known to display a similar lesion, this experimental data would suggest the advisability of decreasing fats and proteids in pre-eclamptic toxemia. A milk diet has been used most widely but this is relatively high in fat and low in carbohydrate. A diet of oatmeal, sugar and whey appear to be more logical. Rice might be used instead of oatmeal as having a lower fat and higher carbohydrate content. Reid Hunt in his work upon "The Effects of Restricted Diet and Various Diets upon the Resistance of Animals to Certain Poisons," points out by experiments, the great value of rice. He gives the impression of favoring oatmeal as it may stimulate the activity of the thyroid gland with beneficial effects. This theory of thyroid stimulation by an oatmeal diet was brought out by Watson. Thus Reid Hunt believes that from his experiments and those of Watson it seems probable that it is possible to influence in a specific manner by diet one of the most important hormones in the body. The question as to whether the food would affect the human organism as it does the animal must be left to future study. Hunt believes that the probabilities are that it

would. The possibility of thyroid insufficiency in the toxemia of pregnancy has been cited by Nicholson, Lange and others.

Reid Hunt calls attention also to the great value of rice and oatmeal in maintaining nitrogen equilibrium as found by Rubner. In feeding these toxemic women the nitrogen equilibrium must be considered. Thus with an oatmeal, sugar and whey diet we would maintain the nitrogen equilibrium and increase the protective power of the diet by a high carbohydrate and low fat content.

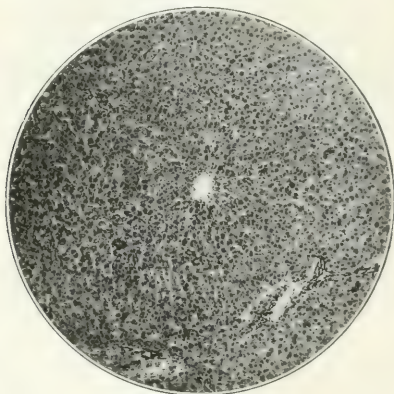
Permit me to cite a case, seen lately, as bearing upon the dietary phase of the question. This patient had been advised not to eat too many sweets during pregnancy. She had a flat pelvis and it was thought that if there could be any relation between carbohydrate ingestion and the weight of the child in this case the physician would be on the right side. Toward the end of pregnancy, to satisfy a voracious appetite, she drank large quantities of milk with the addition of cream. This woman developed a toxemia and had one convulsion. From the standpoint of the above deductions from experimental evidence this woman had been upon an incorrect protective diet. Another phase of this same case was interesting from the standpoint of possible hypothyroidism. During pregnancy this patient took on 23 pounds above the weight of the child. After labor she returned to normal weight in a few weeks. I have seen so much thyroid instability in Minnesota and have seen so many cases comparatively speaking, develop here in pregnancy that I wondered if her increase in weight could have been a manifestation of hypothyroidism of mother and child. If an oatmeal diet, according to Watson, will stimulate the thyroid of young animals, might it not stimulate the thyroid activity of both fetus and mother?

One finds that the theory accounting central liver pathology to a difference between the blood at the center and at the periphery of the lobule has been considered for years. Opie in his illuminating article upon "Zonal Necrosis of the Liver," published in 1904 in the *Journal of Medical Research*, vol. xii, notes this explanation. Before considering experimental data upon this point in chloroform poisoning permit me to recall conditions obtaining in the later months of pregnancy. In these months we have increased pressure on the diaphragm, increased demands for oxygen by the rapidly growing fetus and also if there is any tendency to cardiac insufficiency and stasis the central cells of the liver lobule would be the first to suffer from lack of oxygen. It is suggestive that hydramnios and twins seem to predispose to toxemia and eclampsia, also that

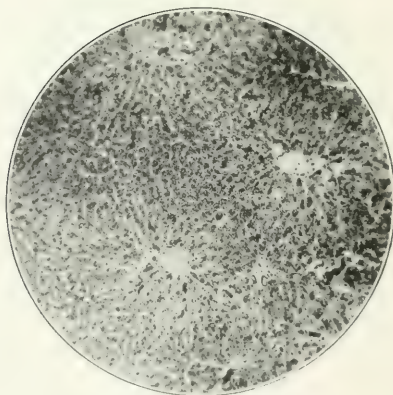
*A**B*

EXPERIMENT 1.—After administration of chloroform rat *A* was placed in a cage in the fresh air. Rat *B* was allowed to suffocate under a large bell-jar. Latter rat died in thirty-six hours, whereupon rat *A* was immediately killed and the livers compared. The fresh-air rat shows less central necrosis and degeneration and mitotic figures absent in the suffocated rat suggests more rapid regeneration.

eclampsia is more frequently seen in primipara than in multipara, the former having previously unstretched abdominal walls with



A

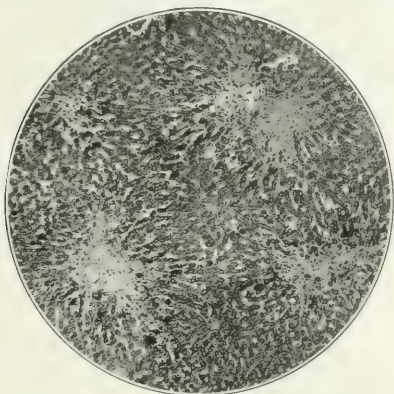


B

EXPERIMENT 2.

consequent increased pressure upon the diaphragm. That the increased pressure may be assumed appears to be supported by the earlier lightening in primipara. It is suggestive that the

death of the child often relieves the toxemia, at least temporarily. May it not be that at least three of the salutary effects of delivery are: relief of pressure on the diaphragm, throwing the child upon its own mechanism for oxygenation, and the relief of venous stasis with a resulting freer oxygenation of the central liver cells? If so, oxygen would be indicated in these cases. Possibly the treatment of pumping oxygen into the udders of cows suffering from milk fever, thought to be analogous to eclampsia in

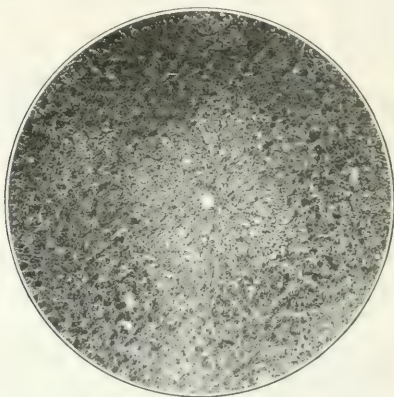


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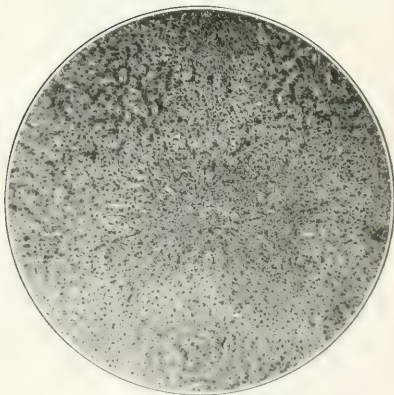
EXPERIMENT 2.—Same as Experiment 1 except that one-half the dose of chloroform was given and a control rat not having had a dose of chloroform was suffocated under the same bell-jar with the chloroformed rat. When the latter rat died in twenty-six hours his mate under the bell-jar was still lively though breathing in a labored manner. Two remaining rats were immediately killed and the livers of the three compared. The liver of the rat A not having had the chloroform did not show a central necrosis. No change of any kind was seen. The liver of the chloroformed and suffocated rat C showed more extensive degeneration and necrosis than did that of rat B having fresh air.

women, may have the chemical basis of increased oxygen for liver cells to sustain it. Stroganoff advocated the use of oxygen in eclampsia seemingly to attempt to counteract the evident cyanosis during the convulsions. It may well be that one of the deadly effects of the convulsions is the increase of liver-cell degeneration caused by decreased oxygen content. In our desire to isolate these eclamptics in quiet rooms we are not always careful about proper ventilation. If deductions can be drawn from the following

experiments I believe that the open-air treatment should obtain in pre-eclamptic toxemia and eclampsia as in sepsis.



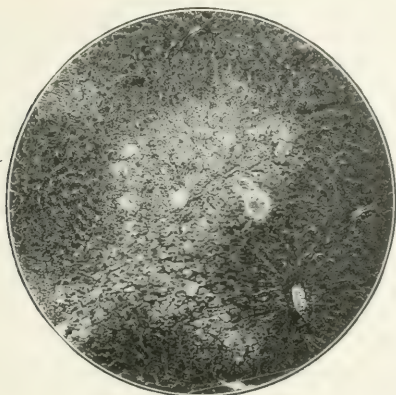
A



B

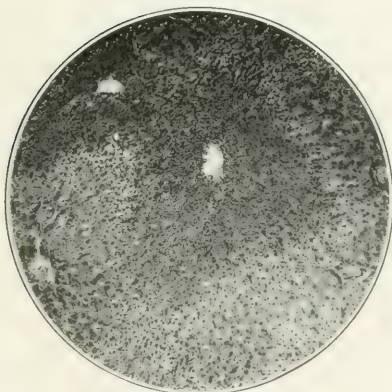
EXPERIMENT 3.—Rat *A*. Chloroform and fresh air. Rat *B*. Chloroform and suffocation as in Experiment 1. Increase in degeneration and necrosis in suffocated rat apparent.

In the following experiments rats were used, and chloroform was the poison administered. The rats were placed upon a corn diet.



A

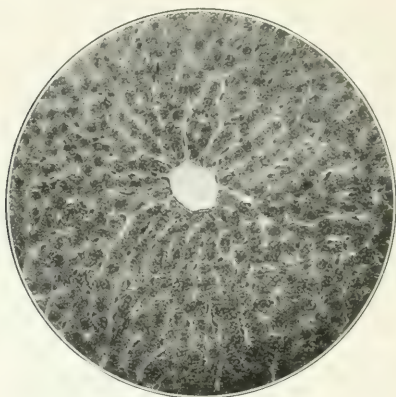
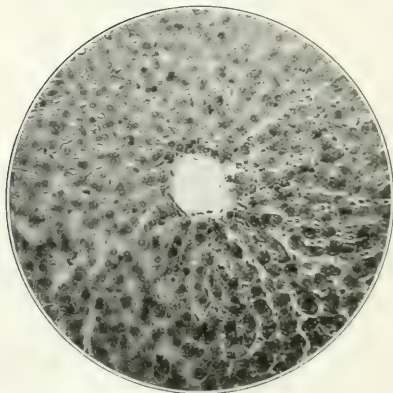
Chloroform and fresh air.



B

Chloroform and suffocation.

EXPERIMENT 4.—Same as Experiment 3. Increase in degeneration and necrosis in suffocated rat is apparent. Dark mass in center of both 3 and 4. *B* consists of necrosed liver cells and venous congestion. High power of same liver given below.

*A**B*

EXPERIMENT 5.—Rat *A* was on a meat diet and survived the chloroform poisoning. Rat *B*, on same diet and survived. On thirteenth day rat *B* was suffocated. Died in twenty-six hours at which time rat *A* was killed and two livers compared. Both show complete regeneration. No apparent difference between *A* and *B*.

EXPERIMENT 6.—Same procedure as in Experiment 5 performed on two rats on a diet of oatmeal and sugar. Same complete regeneration and no apparent difference between fresh air and suffocated rat.

Conclusions: Lack of oxygen without a circulating poison causes no apparent change in the staining reactions of the central cells of the liver lobule, at least after twenty-six to thirty-six hours. Lack of oxygen during the action of chloroform poisoning causes a marked increase in the central degeneration and necrosis in the liver lobule.

The kidneys of the rats dying from chloroform poisoning showed a degeneration of the epithelium of the convoluted tubules but the pathology was not as prominent as in the liver. Also the increase in degeneration in the kidneys of the suffocated rats was not so appreciable.

In closing let me say that I am thoroughly cognizant of the inconclusiveness of these notes and discussions due to the comparative small number of the experiments and to the use of many assumptions. I have taken the liberty of reporting these notes in order to stimulate early experimental and clinical confirmation or refutation. I believe that Opie and Alford are justified in believing that a high carbohydrate diet might be of marked value in præclamptic toxemia and my experiments point to the fact that the administration of oxygen, as advocated empirically by Stroganoff, or treatment in the open air may have a rational pathologic basis for support.

RUPTURE OF THE SCAR OF A PREVIOUS CESAREAN SECTION.

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A YOUNG woman was admitted to the Charité Frauenklinik of Berlin in June, 1915. Two years before she had been Cesareanized at term for a rachitic pelvis. She was in the seventh month of gestation, and was bleeding moderately from a marginal placenta previa. The assistant in charge of the "Kreisszimmer" was of the opinion that a second Cesarean section should be performed, and accordingly the case was submitted to Prof. Franz, who commented upon the wide abdominal scar, but gave no consideration to the possible existence of a defective uterine scar. He counceled against Cesarean section, and gave orders to insert a hydrostatic bag, and after dilatation of the cervix to perforate the head and extract the fetus. These instructions were carried out, and with the second

uterine contraction the patient went into collapse. The fetus was distinctly recognized to be free in the abdominal cavity.

The patient was rushed to the operating room and within thirty minutes the uterus was removed together with the escaped fetus and blood. Death followed within two hours from shock.

A study of the removed specimen revealed a rent directly through a median scar low on the anterior surface of the uterus and largely within the thinned lower uterine segment. It was evident that the uterine scar, as well as the abdominal scar, had become infected following the initial Cesarean section. There was but a thin fibromuscular bridge between the serosa and atrophied mucosa.

In commenting upon the case before the clinic, Prof. Franz said that in the future he would make his incisions high on the uterine body where the muscular development is the greatest, and would advise Cesarean section upon every pregnant woman who bears the scar of a previous section.

A few weeks later I saw Prof. Jardine in the Glasgow Maternity perform a Cesarean section before the onset of labor, because of the existence of a very thin uterine scar. At the same clinic two uteri with ruptured scars were exhibited by Prof. Samuel Cameron.

These observations enlivened my interest in the question of rupture of the Cesarean scar, and has led to a review of the literature for the purpose of determining whether or not one Cesarean section calls for another in event of a subsequent pregnancy. I confess at the onset to have entertained a prejudice in favor of repeated Cesarean section in all cases to forestall a possible rupture, but as the work developed in my library I was led to conclude that such a position is untenable.

In earlier years, when indifferent asepsis and haphazard suturing were practised, we are informed by Krukenberg, in his classical work, that fully half the scars ruptured in subsequent labors. This is in marked contrast to the brilliant results following the adoption of the improved method of suturing proposed by Säger in 1882. From 1882 to 1895 Säger collected reports of 500 cases without a single rupture. From 1895 to 1900 three cases of rupture were recorded and from 1900 to 1911 there were forty cases of rupture and eight of serious dehiscence of the scar recorded. Wyss observes that this increase in the number of ruptures is not chargeable to the growing popularity of Cesarean section, but is perhaps due to departure from the tried and proved method of suture of Säger. While it is true that the exact technic of Säger is not followed in late years, yet the essential principles of the method of suture are generally ob-

served, and it is fair to assume that marked deviations from these principles laid down by Säger have largely accounted for the increase in the number of ruptures. These principles are tier suturing, sutures which pass through the entire thickness of the uterine musculature and placed close together, infolding of the serosa to prevent the formation of adhesions, exclusion of the decidua in the sutures to prevent the interposition of the decidua between the severed muscle fibers, and finally the tying of all sutures tightly to allow of subsequent relaxations and contractions of the uterus without the formation of gaps in the uterine wound. If the above conditions are maintained and the wound remains aseptic there is every reasonable assurance that there will be firm muscular union with little development of scar tissue. Such a wound healing should favorably insure against rupture in event of a subsequent pregnancy.

The character of the suture material, so long as it is sterile, does not seem to enter into consideration. As expressed by Olshausen and Bumm a proper wound healing depends less upon the suture material than upon the method of suturing. In former years poor quality of catgut would give way and still earlier fine silver wire was known to cut through.

Doubtless the greatest factor in the production of insecure wound healing is septic infection. In this connection we are reminded that too often conservative Cesarean sections are performed in the presence of sepsis when sterilization or Porro operation would have been the wise choice. Furthermore, we have to reckon with latent gonorrheal infections (Wyss) and with retained lochia (Jolly) as sources of infection. *This brings us to the admission that there is no positive assurance of obtaining a perfect wound healing whatever the method of suturing or whoever the surgeon. The uterine scar is an unknown factor in all cases.*

The transverse fundal incision, introduced by Fritsch in 1897, has apparently had more than its share of failures in respect to firm healing of the uterine wound. Vogt reported six ruptures in fundal scars. Couvelaire, in his report of fifty cases of rupture of the scar, finds seventeen of this number were through fundal scars. In 1910 Dahlmann reported twenty-six cases of rupture through fundal scars. In view of these reports, and considering the relative infrequency of the Fritsch operation as compared with the classical operation of Säger, we are led to agree with Everke that transverse fundal incisions are relatively insecure. Wyss says that introduction of the transverse fundal incision has not lessened the danger of rupture, and Scheffzek remarked that the unusual tissue distortion, especially

in the fundus in puerperal involution, makes firm union of the scar problematical.

As to the integrity of the scar in extraperitoneal and cervical Cesarean sections, experiences and opinions differ widely. Judgment must be withheld until a larger number of repeated pregnancies following these procedures are on record. Frank reported 8, Sellheim 5, Litschkuss 12, Alow 30, and Rohrbach 93 cases of cervical Cesarean section which have stood the test of labor without rupture, and Vogt concludes that rupture of the scar in the cervix is of rare occurrence.

On the other hand, Routh says cervical and extraperitoneal Cesarean sections are not in favor in England. Traugott, Bumm, Gohardt, Sellheim, and Wolf report marked thinning of cervical scars with impending rupture, and Wyss assumes a skeptical attitude on the dependability of these scars, and expresses the opinion that a bad cervical scar is more dangerous than a fundal scar because of the marked thinning of the lower uterine segment in labor. Chiaji finds thinning of extraperitoneal scars has occurred in 17 per cent. of cases, and concludes that no security is afforded in subsequent pregnancies. Finally, we have the word of Leopold that classical Cesarean section, with its good results for mother and child, remains the most efficient operation, and which alternative procedures will never supplant or restrict.

Numerous authors have described the manner of healing of the uterine wound. A fibrinous deposit forms on the cut surfaces, and beneath this are newly formed connective-tissue cells. If the wound is kept in perfect coaptation, and free of infection, muscular regeneration will effect a complete muscular union, making the scar invisible to the naked eye and scarcely discernable under the microscope. Perfect coaptation may be prevented by infection, by the giving way of sutures and by the alternating contractions and relaxations of the uterus in the presence of loosely tied sutures. Not infrequently the wound opens up at one or more points in the scar. With the separation of the cut surfaces small hematomata are formed and later are replaced by connective tissue with little or no muscle fiber. Such a scar presents a *locus minoris resistentia*, but it is remarkable to note that they are so often capable of resisting the forces of labor. Couvelaire says 75 per cent. of these defective scars will stand the test of labor without rupture. Uteroabdominal fistulæ have developed in a number of instances as a result of insecure knots and in the same manner dehiscences of the entire uterine wound has occurred. Where silk has been used, fistulæ may make their appearance several

months after Cesarean section and may persist indefinitely. The ovum has been known to attach itself to such fistulæ and form a hernial protrusion of placenta and membranes. In these weakened scars a fibromuscular bridge separates the serosa from mucosa. Occasionally there is an entire absence of muscle fiber. The connective tissue may be scant, leaving little more than the serosa and atrophied mucosa to withstand the forces of labor. When catgut is used the sutures will usually be absorbed in thirty to sixty days. Studdiford found chromic sutures practically unabsorbed six and a half years after their insertion. In a number of instances silk sutures have been known to disappear.

Mason and Williams made a series of experiments on pregnant cats and guinea-pigs to determine the relative strengths of scar and normal uterine wall. Weights were suspended from sections of the uterine wall containing linear scars and it was found that rupture invariably occurred in the muscle and not in the scar, thereby confirming the clinical observations of Schauta, who says that with modern closure of the wound rupture will more likely occur outside the scar. In a number of instances the rupture was observed to start in the scar and to extend through the musculature at the side of the scar.

In 50 multiple Cesarean sections performed in the New York Lying-In Hospital, Harrar finds no visible scar or no thinning in 42, thin scars in 4, partial rupture in 2, and complete rupture in 2.

That placental implantation in the scar predisposes to rupture is the opinion of Dahlmann, Vogt, Couvelaire, Schick, Blind, Wyss, Ekstein, Fischer, and Werth. Vogt found the placental insertion in the scar in 9 of 22 recorded cases, Couvelaire in 8 of 9 cases, Dahlmann in 8 of 15 cases. Werth and Ekstein likened the influence of the placenta upon the underlying scar to the trophoblastic function of the placenta in ruptured tubal pregnancy. Decidua and chorionic structures have been observed to penetrate the fibromuscular bridge to the serosa. Fischer, in referring to the relative frequency of rupture in transverse fundal incisions, expresses the opinion that the probable explanation lay in the frequency of placental implantation at the fundus.

Few authors advocate sterilization following Cesarean section unless by the urgent request of the husband and wife. Numerous authors have reported their second, third, fourth, and even fifth Cesarean section on the same individual, and Charles did his sixth Cesarean on the same woman. This may be taken as an expression of confidence in the integrity of the scar. Notably exceptions to

No.	Date.	Operator or reporter.	Indication for C. S.	Para	Age.	No. previous C. S.	Time of rupture.	Location of C. S. incision.	Interval between C. S. and rupture.	Placental site.	
										In C. S.	In rupture.
1	1895	Kobblank	Rachitis	VI	?	1	Term	Median	4 yrs.	In incision	?
2	1896	Guillaume	Rachitis	II	26	1	7 mos.	Median	3 yrs.	?	?
3	1897	Woyer	Rachitis	II	26	1	?	Median	3 yrs.	In incision	In scar
4	1900	Targett	Transv. position; tetanus uteri	?	?	1	Term	Median	2 yrs.	?	?
5	1900	Schneider	?	?	?	1	?	Median	?	?	?
6	1901	Everke	?	III	?	1	?	Median	4 yrs.	?	In tear
7	1902	Galabin	?	?	?	1	?	?	?	?	?
8	1903	L. Meyer	Lumbokypnosis	II	22	1	Term	Transv. fundal	4 yrs.	?	In tear
9	1904	Jardine	?	?	?	1	Term	Transv. fundal	?	?	?
10	1904	Kerr	?	IV	?	1	Term	Transv. fundal	3 yrs.	?	?
11	1904	Ekstein	Rachitis	IV	33	1	Term?	Transv. fundal	3 yrs.	?	In tear
12	1904	Schutte	Eclampsia	II	21	1	Term?	Median	1 yr.	?	?
13	1904	Ribemont-Desaignes and Rudaux	?	?	29	1	Term	?	2 yrs.	?	?
14	1905	Henckel (Prussmann)	Rachitis	III	40	2	Term	Median	3 yrs.	?	?
15	1905	Werth	Rachitis	III	?	1	8 mos.	Median	12 yrs.	?	In tear
16	1905	Schink	Contr. pelvis	III	28	1	Term	Transv. fundal	3 yrs.	?	In region of scar
17	1905	Wyder (Chalewsky)	Contr. pelvis; trans. position	IV	29	1	Term?	Median	5 yrs.	?	?
18	1906	Wilton (Mabbott)	Contr. pelvis	II	23	1	Term?	Transv. fundal	2 yrs.	?	?
19	1906	A. Martin	Eclampsia	III	?	1	7 mos.	Median	2 yrs.	?	?
20	...	Couvelaire	Contr. pelvis	III	?	1	Term	Median	1 yr. 4 mos.	?	In scar
21	1907	Paddock	Contr. pelvis	VI	36	1	Term	?	?	?	?
22	1907	Schneider	Rachitis	V	25	1	Term?	Median	2 yrs.	?	?
23	1908	Hartmann (Franz)	Rachitis	II	23	1	Term?	Transv. fundal	1 yr. 8 mos.	In incision	In scar

Method of suture in C. S.	Results.		Therapy.	Remarks.	References.
	Mother.	Child.			
Silk and catgut	Recovered	Dead	Suture	Febrile convalescence after C. S.; scar much thinned.	Ztschr. f. Geb. u. Gyn., Bd. xiv.
Tier?	Recovered	Dead	Hysterectomy	Convalescence after C. S. febrile; decidua extended to peritoneum in ruptured scar	Zentralbl. f. Gynäk., 1896.
2 layers silk	Died	Dead twins	Porro	Fever after C. S.	Monats. f. Geb. u. Gyn., 1897, Bd. vi.
?	Recovered	Dead	Porro	Normal convalescence	Trans. London Obst. Soc., 1900, vol. xlii.
Not deep enough?	Recovered	Dead	Porro	.....	Deutsch. med. Woch. Vereinsbeilage, p. 179.
"Typical Sanger"	Recovered	Lived	Porro	.....	Monats. f. Geb. u. Gyn., 1901, Bd. xiv.
?	Recovered	Dead	Porro	Tubes ligated at time of C. S.; ulcerating ventral hernia at time of rupture	British Med. Jour.
3 layers catgut	Recovered	Lived	Suture with silk	Febrile convalescence after C. S. with pelvic exudate; scar very weak	Kasuis. meddelelser. Bibliotek f. Laeger.
?	?	?	?	.....	Zentralbl. f. Gyn.
Catgut	Recovered	Dead	Porro	.....	Trans. London Obst. Soc.
3 layers catgut and silk	Died	Dead	Porro	No fever after C. S.; decidua invaded scar in its entire length; rupture after vomiting	Zentralbl. f. Gyn., 1904.
?	Recovered	Dead	Laparotomy and drainage	Utero-abdominal fistula after C. S.; uterus adherent to abdominal wall	Monats. f. Geb. u. Gyn.
Silk in peritoneum	Recovered	?	Porro	.....	Comp. rend. Soc. d'obst. gyn. et ped., Paris.
2 layers catgut	Recovered	?	Suture	Decidua growing into scar; scar very thin	Ztschr. f. Geb. u. Gyn., 1905, Bd. liv.
2 layers catgut	Recovered	?	Porro	Placenta and fetus in abd. cav.; muscle union of entire scar but serosa not united?	Berl. klin. Wochschr. Nr. 27.
2 layers catgut	Recovered	Dead	Suture	Scar consisted of serosa only; fever after rupture; suppuration; no fever after C. S.	Zentralbl. f. Gyn., 1905.
?	Recovered	Dead	Porro	Fever after C. S.	Korresp.-Blatt. f. Schweiz.-Aerzte und Chalewsky, Inaug. Diss., Zurich, 1907.
Chronic catgut	Recovered	?	Suture with chromic catgut	.....	Am. Jour. Obst., 1907, vol. xx.
?	Recovered	?	Resection scar and suture	Normal convalescence	Med. Klin., Nr. 13.
2 layers catgut	Recovered	?	Porro	Fever after C. S.; rupture just to right of scar	Ann. de Gyn., 1906, 2 serie.
3 layers catgut	Recovered	Lived	Porro	Normal convalescence; tubal sterilization.	Illinois Med. Jour. München. med. Woch., 1907, Nr. 41
?	Lived?	Lived?	Suture	Scar consisted practically of serosa and invaded with decidua; rupture in centre; version and forceps delivery	Ztschr. f. Geb. u. Gyn., Bd. 8; Zent. f. Gyn., Nr. 3.
5 layers catgut	Recovered	Dead?	Vaginal hysterectomy		

No.	Date.	Operator or reporter.	Indication for C. S.	Para.	Age.	No. previous C. S.	Time of rupture.	Location of C. S. incision.	Interval between C. S. and rupture.	Placental site.	
										In C. S.	In rupture.
24	1908	L. Meyer	Sarcoma sacri	II	25	1	Term	Transv. fundal	8 yrs.	?	?
25	1908	Lobenstine	?	?	?	2	?	Median over fundus	2 yrs.	?	?
26	1908	Fourrier	Rachitis	?	?	2	?	Transv. fundal	?	?	?
27	1908	Brodhead	?	V	35	1	Term?	Median	2 yrs.	?	?
28	1909	Weber (Weil)	Contr. pelvis	?	?	1	Term?	Transv. fundal	1 yr.	In incision	?
29	1909	Nacke	Contr. pelvis	III	29	1	Term?	Transv. fundal	4 yrs.	?	In scar
30	1910	Richter	?	?	?	2	7 mos.	?	?	?	In scar
31	1910	Dahlmann	Cervix myoma	II	33	1	?	Transv. fundal	1 yr. 8 mos.	?	In region of scar
32	1910	Dahlmann	Vaginal varices	?	?	1	Term?	Transv. fundal	2 yrs.	In incision	?
33	1910	Dahlmann	Rachitis	II	21	1	Term?	Transv. fundal	3 yrs.	?	?
34	1910	Scheffzek	Contr. flat pelvis	II	23	1	Term?	Classical	3 yrs.	?	?
35	1911	Jeannin	?	?	30	1	8½ mos.	Median	1 yr.	?	?
36	1911	Sohick	Edema vulva; eclampsia	III	?	1	Term	Transv. fundal	5 yrs.	?	In tear
37	1911	McPherson	?	III	25	1	In labor	Median	?	In incision	?
38	1911	Hermann	?	?	?	1	?	?	?	?	?
39	1911	Coeq and Massay	Flat pelvis	III	?	2	?	1. Trans. fundal. 2. Median	5 yrs. after 2d C. S.	?	In tear
40	1911	Unterberger	Eclampsia	II	22	1	Term?	Transv. fundal	2 yrs.	?	?

Method of suture in C. S.	Results.		Therapy.	Remarks.	References.
	Mother.	Child.			
Tier: 2 layers catgut	Recovered	Lived	Porro	Febrile convalescence after C. S.; ventral hernia	L'Obstétrique. Lan-née, February.
3 layers catgut	Died 17 days later, pneumonia	?	Supravaginal hysterectomy	Rupture extended from os internum to fundus mid-line.	Bull. Lying-in Hosp. 1906-1907.
?	Recovered	Dead	Vaginal hysterectomy	Rupture followed induction of labor with bougie	Bull. de la soc. de gyn., April 16.
Chronic catgut	Died	Dead	Vaginal hysterectomy	.....	Am. Jour. Obst., lvii.
3 layers catgut	Recovered	Lived	Total hysterectomy	Tear exactly in scar	Weber, Beitr. f. Geb. u. Gyn., Bd. xv; Weil, Inaug. Diss., Munich.
2 layers catgut?	Recovered	?	Suture of tear	Rupt. found on manual removal of placenta; plac. invasion of scar; death due to pul. embolism	Zentralbl. f. Gyn., 1909.
?	Died	?	Porro	Utero-abdominal fistula developed four months after C. S.	Gyn. Rundschau.
3 layers catgut	Died	?	Postmortem	Fever after C. S. with pelvic exudate; remnants of catgut sutures; decidua extended to serosa	Monatseh. f. Geb. u. Gyn., Bd. xxxii.
2 layers silk; 1st including decidua	Recovered	Dead	Hysterectomy	Mucosa extended to serosa; fistula dev. one mo. after C. S., due to silk suture; healed on its removal.	Monatseh. f. Geb. u. Gyn., Bd. xxxii.
3 layers catgut	Recovered	Lived	Scar resected and suture	Fever after C. S.; no symptoms of rupture before operation; scar in unruptured part very thin	Monatseh. f. Geb. u. Gyn., Bd. xxxii.
?	Died	Dead	Porro	Fever after C. S.; abdom. suture infection; scar adherent to abdom. wall and ruptured in entire length	Ztschr. f. Geb. u. Gyn., Bd. lxxvii, Hft. 3.
"Exact suture" Reindeer tendon	Recovered	Dead	Porro	No fever after C. S.; rupture in spite of weak labor pains; scar thick with evidence of complete muscle healing	L'Obstétrique, 1911, No. 3.
2 layers silk	Died	Lived	?	Version and extraction; rupture then found with placenta in abdominal cavity; autopsy: scar very thin; decidua extended to serosa	Deutsch. med. Woch.
?	Recovered	Lived	Resection scar and suture	Protracted fever after C. S.; unruptured part of scar very thin; resection of tubes	Am. Jour. Obstet., 1911, lxiii, 3.
?	?	?	?	Rupture in region of scar; fetus and membranes in abdominal cavity.	Acad. de méd. de Belgique., v. Coeq., No. 38.
?	Died	Dead	?	Rupture in clinic; rupture in form of "T"; fundal scar only serosal union; synectial elements invaded muscle in median scar	Rev. mens. de gyn., d'obst. et ped.
?	Recovered	Dead	Supravaginal amputation	No fever after C. S.; vaginal hysterectomy; rupture then found in old scar, which was very thin	Monatseh. f. Geb. u. Gyn., Bd. xxxiv, Heft 3.

No.	Date.	Operator or reporter.	Indication for C. S.	Para.	Age.	No. previous C. S.	Time of rupture.	Location of C. S. incision.	Interval between C. S. and rupture.	Placental site.	
										In C. S.	In rupture.
41	1912	Schwartz	Eclampsia; edema vulva	II	30	1	8 mos.	Transv. fundal	3½ yrs.	?	?
42	1912	Ramos	Eclampsia	II?	?	1	8½ mos.	Transv. fundal	1½ yrs.	?	?
43	1912	v. Herff (Wyss)	Edema vulva; eclampsia	II	27	1	About term	Median	1 yr. 8 mos.	?	In tear
44	1912	Wyss	Rachitis	II	26	1	Term	Classical	3 yrs. 3 mos.	In incision	On posterior wall
45	1912	Jolly	Rachitis	IV	27	1	Term	Median on posterior wall	1 yr. 3 mos.	Anterior wall	?
46	1912	Hofmeier (Fischer)	Contr. pelvis	V	38	2	8½ mos.	1. Transv. fundal; 2. ?	6 yrs.	1. In incision; 2. ?	Partly over tear
47	1912	Davis (Harrar)	Flat pelvis	VIII	33	1	In labor	Median	2 yrs.	?	In tear
48	1912	Davis (Harrar)	Contr. pelvis	V	37	3	11 mos.	All longitudinal	3 years after 3d C. S.	?	?
49	1914	Wolff	Rachitis	II	30	1	Term	Cervical extending into body	1 yr.	?	?
50	1913	Davis	Kyphotic dwarf	II	?	1	In labor	Median through fundus	1 yr.	?	?
51	1913	Weisschnadel (Everke)	Contr. pelvis	II?	?	1	Term	Transv. fundal	4 yrs.	?	?
52	1914	Walls	Dwarf	?	30	3	7 mos.	?	1 yr.	?	Over scar
53	1914	Walls	Contr. pelvis	?	?	1	Term	?	?	?	?

Method of suture in C. S.	Results.		Therapy.	Remarks.	References.
	Mother.	Child.			
3 layers catgut	Recovered	?	Supravaginal amputation	Slight fever on third day after C. S.; rupture through entire length of scar; fetus and placenta in abdominal cavity	Monatsech. f. Geb. u. Gyn., Bd. xxxv, Heft 5.
Silk	Recovered	Dead	Supravaginal amputation	Four days after C. S. abdominal wound separated with eventration; at rupture fetus and placenta in abdominal cavity	Revue de la clin. obs. et gyn., January and February, 1912 ref., Ztschr. f. Gyn., 1913, Nr. 8.
2 layers silk	Recovered	Dead	Porro	Rupture after vomiting; scar thin in fundal region only of mucosa and serosa; synovial invasion of scar	Beitr. f. Geb. u. Gyn. Bd. xvii, Heft 3.
2 layers catgut	Recovered	Lived	Porro	Fever after C. S.; scar thin in places; some muscle fibers in more solid part of scar	Beitr. f. Geb. u. Gyn. Bd. xvii, Heft 3.
2 layers catgut	Recovered	Lived	Supravaginal amputation	Fever after C. S.; decidua extended to serosa; unruptured part of scar showed complete muscle union	Arch. f. Gyn., Bd. 97, Heft 2.
1 deep silk; 3 layers catgut	Died	Dead	Supravaginal amputation	Fever after C. S.; at 2d C. S. scar found to be thin; no fever after 2d; complete rupture of scar which consisted of serosa only with decidua and syncytial tissue	Ztschr. f. Geb. u. Gyn., 1912, Bd. lxx, Heft 3.
?	Recovered	Lived	Resection of scar and suture	.....	(Harrar) Am. Jour. Obst., 1912, lxx, 5.
?	Died	Dead	Hysterectomy	Fever after 3d C. S.; complete muscle regeneration; rupture between two of the scars; overtime fetus and placenta in abdominal cavity	(Harrar) Am. Jour. Obst., 1912, lxx, 5.
2 layers catgut	Recovered; cerebral embolism on tenth day	Dead	Total hysterectomy?	Fever after C. S. with utero-abdominal fistula; rupture through scar which was thin with decidua extending almost to serosa	Ztschr. f. Geb. u. Gyn., 1914, Bd. lxxv, Heft 3.
?	Died	Dead	Suture	Normal convalescence after C. S.; rupture of entire scar; fetus and placenta in abdominal cavity	Trans. Am. Assn. Obstet. and Gyn., 1913, xxvi, 43.
?	Recovered	?	Supravaginal amputation	Fever after C. S.; complete rupture of scar; fetus and placenta in abdominal cavity; scar of serosa only	Monatsech. f. Geb. u. Gyn., 1913, Bd. xxxvii, Heft 2.
?	Died	Dead	Supravaginal amputation	.....	Jour. Obstet. and Gyn. Brit. Emp., 1914, xxvi, No. 4.
?	?	Dead	Supravaginal amputation	Scar long, wide and thin, and about to give way; small opening in lower angle of scar; section showed no degenerative changes to account for rupture	Jour. Obstet. and Gyn. Brit. Emp., 1914, xxvi, No. 4.

No.	Date.	Operator or reporter.	Indication for C. S.	Para.	Age.	No. previous C. S.	Time of rupture.	Location of C. S. incision.	Interval between C. S. and rupture.	Placental site.	
										In C. S.	In rupture.
54	1914	Shaw	?	?	?	1	Term?	?	20 mos.	?	In tear
55	1914	Breitstein	?	?	?	1	Term?	?	?	?	?
56	1914	Franz	Rachitis	II	24	1	7 mos.; plac. previa	Median (low)	1 yr.	?	Not in tear
57	1903	Futh (Kretz)	?	II	25	1	?	?	1 yr.	?	?
58	1914	Applegate	Contr. pelvis	II	30	1	?	Median	18 mos.	?	?
59	1913	Webster (Davis)	Nephritis	III	37	1	Term?	Median	?	?	?
60	1914	Hillis, D. S.	Eclampsia	II?	?	1	Labor	Median	1 yr.	?	?
61	1915	Williams, J. W.	Contr. pelvis	III	?	1	7 mos?	Median	1 yr. 2 mos.	?	?
62	1914	Miller (Jeff.)	Failure of head to engage	I	30	1	In labor full term	Median	15 mos.	Right of incision	Over scar
63	1915	Miller (Jeff.)	Slight contraction	II	18	1	In labor full term	Median (low)	1 yr.	?	Not in tear

this viewpoint are Jardine, Opitz, and Govrich, who advocate sterilization after the second Cesarean section.

John T. Williams, in writing on, "Delivery by the Natural Passages following Cesarean Section," takes issue with Breitstein, Couvelaire, Marioton and others who are committed to the rule of "once a Cesarean section, always a Cesarean section." He says: "When a uterus has been sutured with care and there has been no subsequent infection the Cesarean scar will be strong enough to withstand the distention of a full-term pregnancy and even the strain of a full-

Method of suture in C. S.	Results.		Therapy.	Remarks.	References.
	Mother.	Child.			
?	Recovered	Dead	Supravaginal amputation	Entire scar ruptured; section showed increase in fibrous tissue but insufficient to account for accident	Jour. Obstet. and Gyn. Brit. Emp., 1914, xxvi, No. 4.
?	?	?	Hystereotomy	After C. S. a 2d labor terminated per viam naturalem; rupture in third pregnancy.	Jour. Am. Med. Assn., 1914, lxii, 689.
?	Died	Dead	Hystereotomy	Induction of labor by bag; rupture in a half hour of entire length of scar, which was thin and only fibromuscular tissue	Not reported; personal observation.
2 layers	Recovered	?	Porro	Fever after C. S.; placenta not found (?); pathological insertion of placenta (?)	Zentralbl. f. Gyn. (?), ref., Wyss, Beitr. f. Geb. u. Gyn., Bd. xvii, Heft 3.
?	Died	Dead	Hystereotomy	Fever after C. S.; in hospital two months; scar very thin, showing evidence of poor union.	Not reported; personal communication.
?	Died	Dead	None; rupture found at autopsy	No history obtainable; induction of labor with bag, version, and extraction; dead fetus; died two hours later; autopsy revealed rupture along entire scar and extending toward left tube	Surg., Gyn. and Obstet., July, 1913.
3 layers catgut	Recovered	Dead	Suture	Rupture in scar through entire length; rupture two hours after onset of labor	Not reported.
?	Recovered?	Dead	Supravaginal amputation	Fever after C. S.; rupture probably occurred two days before operation; no suggestion of rupture; intact scar and placenta in abdominal cavity	Not reported; personal communication.
3 layers 20-day catgut	Died	Dead	Suture of rupture	Ruptured on operating table in preparation for C. S.; death from shock in three hours; fever course after C. S.	Not reported.
?	Recovered	Dead	Suture of rupture	Fever course following C. S.; prolonged labor; entered hospital after rupture; pituitrin given by midwife prior to rupture.	Not reported.

term labor." He bases his conclusions upon the records of thirty-two cases reported by Van Leuwen with additional cases of his own.

In none of these cases did the scar rupture during pregnancy or in the delivery through the natural passages.

Among the safeguards against rupture through the scar of a Cesarean section is the relative sterility of these cases. It is estimated that less than half of them again become pregnant. Furthermore, it is noted that a long interval between the section and subsequent pregnancy adds to the security of the scar. Asa B. Davis

tells us that he believes rupture of the scar could have been prevented in all of his cases had a timely Cesarean operation been possible. Second only in importance to timely intervention by repeated Cesarean section when there is reason to believe that the uterine scar is defective or where obstruction exists to the passage of the fetus, is the avoidance, as far as possible, of all intrauterine manipulations such as versions, the application of forceps, the introduction of hydrostatic bags, tampons and pituitrin.

Inasmuch as the great majority of all cases (75 per cent.) that have ruptured ran a fever course following the Cesarean section, I would formulate the rule that all such cases call for serious consideration in event of a subsequent pregnancy.

Repeated Cesarean sections are said by many to give better results than primary Cesarean section, because of the frequent presence of adhesions which wall off the general peritoneal cavity and make it possible to deliver the baby without entering the free abdominal cavity. Such a case I recently witnessed in Polak's clinic at the Long Island Hospital of Brooklyn. Brodhead and Sinclair suggest ventrofixation of the uterus by suturing the uterus outside the margins of the wound to the parietal peritoneum. In thirty cases reported by Sinclair, pregnancy was terminated without untoward symptoms. But, as Wyss observed, ventrofixation has been followed by rupture, and it remains for the future to determine the merits of the procedure. Certainly it is not in line with recognized surgical procedure. We can scarcely hope to have the good fortune of Bar, who has seen no disturbance to mother or fetus from adhesions.

The following data are deduced from the foregoing tables of case reports:

AGE.

In thirty-seven cases, where ages are given, rupture occurred in twenty-one between the ages of twenty to thirty and fourteen between thirty to forty.

NUMBER OF CESAREAN SECTIONS PERFORMED PRIOR TO RUPTURE.

- 55 cases had 1 C. S.
- 6 cases had 2 C. S.
- 2 cases had 3 C. S.

INDICATIONS FOR C. S. PRIOR TO RUPTURE

- In a total of 49 cases there were:
- 32 for contracted pelvis.

- 1 for lumbokypnosis.
- 1 for sarcoma of sacrum.
- 1 for vaginal varices.
- 10 for eclampsia.
- 1 for transverse position with tetany uteri.
- 1 for transverse position with contracted pelvis.
- 1 for nephritis.

PARA.

Ruptures occurred in:

- 2d pregnancy in 23.
- 3d pregnancy in 11.
- 4th pregnancy in 3.
- 5th pregnancy in 4.
- 6th pregnancy in 2.
- 8th pregnancy in 1.

TIME OF RUPTURE.

Time of rupture was mentioned in the reports of 52 cases:

- In 41 cases at full term.
- In 6 cases at seventh month.
- In 2 cases at eight month.
- In 3 cases at eight and one-half months.
- In 1 case at eleventh lunar month.

INTERVAL BETWEEN C. S. AND RUPTURE.

- 9 between 1 and 2 years.
- 22 between 2 and 3 years.
- 6 between 3 and 4 years.
- 4 between 5 and 6 years
- 1 in 8 years
- 1 in 12 years.

LOCATION OF C. S. INCISION.

In 53 cases:

- 33 were median
- 20 were transverse fundal.

METHOD OF SUTURE IN C. S.

In 36 cases there were:

- Tier sutures in 29 (22 of catgut alone, 3 of both catgut and silk, 4 of silk alone).

Typical Snger suture in 1.
Peritoneum alone sutured with silk in 1.
"Exact" suturing with reindeer tendon in 1.
Silk used but manner of suture not recorded in 1.
Catgut used but manner of suture not recorded in 1.

PLACENTAL SITE IN C. S.

Mentioned in 10 cases.
Incision made over placenta in 98.
Placenta on anterior wall in 2 at side of incision.

PLACENTAL SITE IN RUPTURE.

Mentioned in 20 cases.
In or near the tear in 18 cases.
Not in tear in 2 cases.

TREATMENT OF RUPTURE.

Suture of wound in 15.
Porro in 19.
Vaginal hysterectomy in 3.
Total abdominal hysterectomy in 2.
Supravaginal hysterectomy in 11.
Laparotomy and drainage in 1.
Rupture found at autopsy in 2.
Unmentioned in 4.

RESULTS TO MOTHER.

Mentioned in 59 cases.
41 recovered.
16 died.
2 died on tenth and seventeenth days (cerebral embolism,
pneumonia).

RESULTS TO CHILD.

47 mentioned.
34 died.
13 lived.

GENERAL REMARKS.

Fever followed C. S. in 24 cases.
Decidua mentioned as invading scar in 10 cases.

Syncytium mentioned as invading scar in 2 cases.

Scar mentioned as very thin in 17 cases.

Scar with complete muscular regeneration in 4 cases.

In only one case did normal labor intervene between C. S. and rupture.

Uteroabdominal fistulæ developed in scar of C. S. in 4 cases.

Tubal sterilization done in 2 cases following suture of rupture.

Rupture mentioned as following induction of labor by bag or bougie and by version and extraction in 5 cases.

In one case pregnancy and rupture followed ligation of tubes at time of C. S.

In one case rupture occurred while patient was being prepared for Cesarean section.

CONCLUSIONS.—1. A perfectly healed Cesarean wound may be relied upon to resist the forces of labor, but in view of the fact that the integrity of the wound is an unknown factor in all cases we are constrained to exercise the utmost caution in the conduct of every case in pregnancy and labor following Cesarean section.

2. Failure to secure perfect healing is accounted for by departure from the principles of suture proposed by Säger and by septic infection of the uterine wound. If we are to obtain the uniformly good results in respect to wound healing that were obtained in the decade following the introduction of the Säger method of suture, we must not deviate from these principles.

3. The possible existence of latent gonorrheal infection may defeat the most painstaking efforts to secure perfect wound healing. Hence it follows that the healing of a Cesarean wound is always an uncertain factor.

4. When Cesarean section has been followed by a fever course the uterine wound should be regarded as insecure in event of a subsequent pregnancy, and should call for a repeated Cesarean section at the onset of labor.

5. Sterilization and hysterectomy should replace conservative Cesarean section when infection is known to exist. The alternative invites faulty wound healing, if not more disastrous results.

6. Transverse fundal, extraperitoneal, and cervical incisions have not lessened the liability of rupture in subsequent labors, but, on the contrary, have probably increased the hazard.

7. The possibility of rupture of the scar following Cesarean section does not justify sterilization, but rather calls for the exercise of masterly control in event of a subsequent pregnancy. All such cases should be hospital cases and labor should be anticipated by

timely repetition of Cesarean section at the onset of labor if the uterine wound is known to be defective or if some cause for obstruction to the delivery of the child through the natural passage exists. Version, high forceps, uterine tampons, hydrostatic bags, and pituitrin should never be employed in the presence of a Cesarean scar.

8. Finally, we may conclude that in view of the evidence that not more than 2 per cent. of ruptures occur in subsequent labors, we are not justified in voicing the slogan "*once a Cesarean section, always a Cesarean section*," neither are we to rely explicitly upon the integrity of the uterine scar in any case. Furthermore, we would conclude that the liability of rupture is a real danger and should stand as an argument against the increasing tendency to widen the scope of elective Cesarean operations.

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RESULTS FROM PITUITARY EXTRACT IN OBSTETRICS. WITH REPORT OF CASE OF RUPTURE OF THE UTERUS FOLLOWING ITS USE.*

BY

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BEGINNING with its introduction into obstetrics, in 1909, pituitary extract has passed through all of the intense enthusiasm which the profession always displays toward any new drug producing pronounced physiological action. The early literature circulated by prominent pharmaceutical houses in which it was claimed that after immense clinical and laboratory experimentation, it was now marketing an oxytocic which could be used in any case, and during any stage of labor, without bad results, was doubtlessly responsible for many of the reported ill-effects following its use.

But this initial enthusiasm was gradually replaced by a saner conception of the uses of the drug in obstetrics, and the final status of the drug is beginning to become fairly well established.

It is disheartening, however, to find in the recent literature an article by a prominent gynecologist in which, disregarding prac-

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tically all of our recently acquired knowledge of the contraindications to its use, he advocates, with very few exceptions, its use in nearly every case.

As an example illustrating the effects of the drug when given indiscriminately and without very careful study of the individual case, I shall give the history of a case of rupture of the uterus, which occurred in our out-patient clinic:

"Dispensary 1957, Hosp. 29533, Mrs. D., aged twenty-three, para-iv, nativity Mexico. Applied for dispensary service December 20, but was not seen until 9.30 A.M., December 21, two and one-half hours after the onset of labor. The following history was obtained:

No history of rickets, syphilis, gonorrhea, heart or lung conditions. No history of injury or operations.

Menstruation began at ten years, was regular of the twenty-eight-day type, lasted three days, amount of blood stated as moderate, menstruation not associated with pain. Date of last menstruation not known.

Patient was married in 1910 at the age of eighteen. History of previous pregnancies negative.

History of First Labor, 1911.—Delivered at home by private physician. Patient was in active labor for forty-two hours and was delivered with forceps. The indication was not stated. The baby lived. Mother was in bed for fourteen days after confinement, and states that her physician told her that she did not run any temperature at the time. Recovery was good except for pain in right thigh, dating from this pregnancy. This is said to be so severe that at times she can scarcely walk.

History of Second Labor, 1912.—Spontaneous delivery, weight of child not stated, but said to be a good-sized baby. Puerperium normal.

Third Labor in 1914.—Delivered at home by private physician. Duration of labor ten hours. (Her physician states that he applied low forceps after the head had been on the perineum for one hour, and easily delivered a 7-pound living child. The puerperium was uneventful.)

History of present pregnancy negative regarding headache, edema, dizziness, epigastric pain.

History of Present Labor.—First stage began December 21, 1915, at 7 A.M. The pains were of moderate severity occurring regularly at ten-minute intervals. The membranes ruptured spontaneously at 8.30 A.M. before the arrival of physician.

The externe on the out-patient service arrived at 9.30 A.M., and after the usual preparation, consisting of sponge bath, close clipping of pubic hair, thorough scrubbing of area between ensiform and knees with green soap and water, followed by external douche of Liq.-Cresolis Comp., examined the patient, recording the following findings.

Temperature 98, pulse 80, hard bearing-down pains, lasting one minute, occurring regularly at five-minute intervals. External examination showed a cephalic presentation, left occipito-anterior, the fetal heart being heard in the lower left abdominal quadrant, 145 per minute, regular and strong. The woman was a strong-looking Mexican, weight 145 pounds, height 5 feet $4\frac{3}{4}$ inches, pelvic measurements as follows:

Interspinous 21 cm., intercrystal $25\frac{1}{2}$ cm.

Bitrochanteric 29 cm., external conjugate 21 cm.

Internal Examination.—Well-engaged head, sagittal suture in the right oblique, small fontanelle anterior to the left, cervix completely effaced and dilated to three fingers.

Second internal examination, two hours after the first, showed complete dilatation and effacement, head well engaged below the ischial spines, position L. O. A.

At 11.45 A.M. the pains began to decrease in severity and the patient did not seem to be making any progress, and at 12.15, one hour after the second internal examination, the pains being very weak, the case was reported to me and an injection of 1 c.c. of extract of the pituitary body was advised. This was given at once. Five minutes after the hypodermic injection, external examination showed uterus in tetanic contraction, which in two minutes was followed by relaxation, and a complaint by the patient that "she felt like a spring had broken in the abdomen and the baby had slipped back." She now complained of pain in the epigastric region and in the chest. Patient seemed comfortable and rather listless, and the nature of the complication not being recognized, no report was made by the externe until 3 P.M., when Dr. A. A. Blatherwick, Assistant Attending Obstetrician, was asked to see the case. Maternal pulse 120, fetal heart not heard.

On external examination Dr. Blatherwick found a soft abdomen, no dulness in flanks, fundus uteri at the ensiform, fetus in the left occipitoanterior position, head in inlet but movable. Maternal pulse 120, fetal heart not heard.

Patient did not appear to be in serious condition. An absolute diagnosis of rupture of the uterus could not be made, so under light ether anesthesia a very easy forceps delivery was done. Time required for the delivery was ten minutes. Child was a well-developed female, weight $7\frac{1}{2}$ pounds, stillborn.

With external hemorrhage as an indication, manual extraction of the placenta was done forty-five minutes after delivery. The placenta was found outside of the uterus, in the abdominal cavity. After delivery of the placenta uterus contracted well, and there was no external bleeding of any consequence.

Patient entered Los Angeles County Hospital at 7.20 P.M., exactly seven hours after the rupture had occurred.

Examination on admittance: Pulse 138, semi-comatose, abdomen distended, fundus at the umbilicus, moderately contracted. Patient complains of air hunger but no pain. Diagnosis: rupture of uterus, complete, immediate operation advised and accepted.

Operation December 21, 1915, 7.30 P.M. Anesthetic, ether, by the open-drop method. Ten centimeter median line incision, below the umbilicus. On opening the peritoneum abdominal cavity was found well distended with fresh blood. A transverse rupture of the lower uterine segment was found, extending from one broad ligament to the other. The edges of the uterine muscle were so badly lacerated that I deemed it best to do a supravaginal hysterectomy. The case was drained with one large cigarette drain, through the lower angle of the abdominal incision.

Postoperative History.—Drain was removed in thirty-six hours; maximum temperature was 102.6 on the fifth day. Sutures were removed on the ninth day, and patient allowed to be up in the wheel chair. Patient was discharged on the twenty-first day after the operation and left the hospital.

Final examination January 26, 1916, thirty-six days after operation. Well-healed scar below umbilicus, length 7 cm., slightly wider at lower angle. Vaginal examination: very small cervix, with a slight bilateral laceration, very high up in the pelvis. The right side of the pelvis seemed to be flattened out, and to lie nearer the median line than the left side. The external oblique diameters were taken at the final examination, and found to be "right oblique" 22 cm., "left oblique" 20 cm. From the last lumbar spine to the right anterior superior spine measured 16.5 cm. and to the left anterior superior spine 18 cm. The diagnosis was an obliquely contracted pelvis of Naegele.

In this case the conditions present before the drug was given were a well-engaged head, complete dilatation, ruptured membranes, and a decrease in the strength of the uterine contractions. The fault to be found with its use in this case lay in the nonrecognition of an obliquely contracted pelvis.

There are a great number of cases appearing in the literature in which the following complications have followed the use of the drug: postpartum atony of the uterus, fetal asphyxia, maternal collapse, eclamptic convulsions, tetanus uteri, premature separation of the placenta, and rupture of the uterus.

Mundell has collected reports of seven maternal deaths from rupture of the uterus following its use. He also mentions the case reported by Herz, in which the patient was a primipara of twenty, weak and anemic, and in the first stage when extract of pituitary was given. She had a flat rhachitic pelvis, and had been in labor for two days. In this case the vaginal portion of the cervix was entirely torn off from the anterior wall of the uterus, but there was no rupture communicating with the peritoneal cavity. The child was delivered spontaneously, and both mother and baby recovered. The treatment was expectant.

Mosher, in *Surgery, Gynecology and Obstetrics*, reports a death

following the use of pituitrin in a case in which a transverse presentation was present. Rupture of the uterus and immediate death of mother and child followed.

Huggins, in *THE AMERICAN JOURNAL OF OBSTETRICS*, mentions a complete rupture of the uterus in a multipara in which there was no abnormality of the pelvis, and whose previous obstetrical history was normal. From the statement of the attending physician, Huggins was inclined to believe that there had been some malposition of the head, with resulting delay at the brim. Dilatation was complete when the drug was given. Rupture of the uterus, with complete supravaginal amputation of the organ, occurred five minutes after administration of the pituitrin. The patient died in five days of general peritonitis.

Zullig, in *Muenchener medicinische Wochenschrift*, reports a case of rupture of the uterus in a multipara (para-xiii) whose previous labors had always been instrumental, and usually had been terminated with a craniotomy. The diagonal conjugate was 10.5 cm. Induction of labor at term, followed by a hypodermic of extract of pituitary body resulted in a complete rupture of the uterus. A complete hysterectomy was done at once, the patient finally recovering.

Zullig also reports four additional cases collected from the foreign literature, in all of which the rupture was followed by the death of the mother.

From a careful study of the literature we are able thus to summarize the following authentic cases of rupture of the uterus following the use of pituitary extract:

Reported by	Cases	Deaths	Recoveries
Mundell.....	7	7	0
Herz.....	1	0	1
Mosher.....	1	1	0
Huggins.....	1	1	0
Zullig.....	5	4	1
McNeile.....	1	0	1
Total.....	16	13	3

In the services of the division of obstetrics, Los Angeles Health Department, the Maternity Cottage and at the Los Angeles County Hospital, covering about 1000 deliveries each year, we began the use of the pituitary extract at the time of its introduction into obstetrics in 1909.

During the first year after its introduction, and before any definite

contraindications had been noted, the drug was used indiscriminately, without very much regard for any specific indications, and with no definite idea of insisting upon certain conditions being present before the drug was administered. But as the number of our cases in which the drug was used began to grow, and the results of its use were noted, we began to realize the extreme potency of the drug with which we were dealing, and to formulate certain indications and conditions which should always be present before the use of the drug was considered. In this Clinic we have also experimented extensively with the dosage of the drug, under practically all of the conditions under which we believe its use is indicated.

In this series of cases, the drug has been administered approximately three hundred times. We have noted in this Clinic many cases in which the complications reported by other observers have followed the use of the drug. Of these complications we have noted several cases of tetanus of the uterus. These cases have followed the use of the drug in doses of from 5 minims in two instances to 1 c.c. in several other cases. We do not believe that the currently accepted statement that the injection of extract of pituitary body produces only rhythmical and physiological contractions of the uterus has any basis when the many cases of tetanus of the uterus, as reported by well-trained observers, have been carefully considered.

The drug in our hands has not given satisfactory results when used in primiparæ. We have noted more tendency toward tetanic contractions of the uterus in primiparæ than in multiparæ. In a large proportion of cases these tetanic contractions have not been succeeded by normal rhythmical contractions and the use of the drug has been followed by a low forceps operation. Again in primiparæ we have noted an extremely large number of cases in which the use of the drug has been followed by fetal asphyxia. In none of these cases, however, was the result fatal to the child.

We do not believe that the drug is indicated in any case of toxemia of pregnancy, particularly in the cases of preeclamptic toxemia associated with high blood pressure.

We have noted in several cases, particularly in those of prolonged labor and in multiparæ in which several pregnancies have followed in rapid succession, that postpartum atony of the uterus frequently followed the use of the drug and in several cases an alarming postpartum hemorrhage has resulted. From the observed results in this Clinic we have formulated the following conditions:

1. Complete dilatation and effacement.

2. The membranes must be ruptured.
3. Presentation should be longitudinal.
4. In cephalic presentations there should be no deflection of the head and the drug should only be used in vertex and breech presentations.
5. There should be no disproportion between the presenting part and the pelvis. Before the use of the drug the previous obstetrical history should be carefully considered and special emphasis should be paid to the consideration of any operative deliveries. An accurate knowledge of the internal pelvic measurements, of the contour of the pelvis and of the measurements of the outlet is essential.
6. The presenting part should be completely engaged. In this paper we consider engagement as being complete only after the greatest diameters of the presenting part have passed below the pelvic inlet. The term does not bear any reference to fixation of the head.

The object of this paper is then to call attention to the extremely large number of unfavorable results which have been reported following the use of the drug. This drug has absolutely no place in normal obstetrics. As an extremely active oxytocic in properly selected cases it has no equal. To attempt to use the drug indiscriminately as has been advised recently by the gynecologists referred to will result in a great injury to many patients and will ultimately lead to an undeserved condemnation of the drug.

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626 MARSH-STRONG BUILDING.

THE RELATIONSHIP BETWEEN PELVIC DISEASE AND MANIC-DEPRESSIVE INSANITY.*

BY

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IN a previous paper(1) the writer called attention to the fact that several reports regarding the effect of surgical operations performed on insane women were erroneous and misleading because no attempt had been made to classify the psychoses met with. Two exceptions to this statement are the papers published by Broun(2) and Taussig(3).

In considering the cases operated upon at the King's Park State Hospital we have grouped the various psychoses into two divisions. The first division includes all the psychoses characterized by dementia or intellectual enfeeblement. Perkins(4) calls these the malignant psychoses. It includes general paresis, dementia precox and a few cases of epileptic dementia, constitutional inferiority and Korsakoff's polyneuritic psychosis. There are 160 cases in this group and none of them were benefited mentally by the operative procedure, which again bears out our contention, previously made, that no woman suffering with one of these forms of insanity will be benefited by an operation for pelvic disease.

The importance of this statement is easily grasped. To the consultant it means, when he is asked whether or not an operation on an insane woman will be beneficial, that he should first determine what psychosis is present, and that if she has one which is characterized by dementia his answer should be in the negative. Any operation performed on a patient with a malignant psychosis is done simply to improve the physical condition.

Twelve cases which were diagnosed as allied to dementia precox have been discharged as improved, but as they do not fall into the above group they will not be considered. Three cases of epilepsy with excitement have been discharged improved, but as they did not show dementia they also will be disregarded as far as this classification is concerned.

* Read before a meeting of the New York Obstetrical Society, May 2, 1916.

Taking up the second division for discussion we find an entirely different set of pictures. In this group we have placed the various benign psychoses, those not characterized by dementia. The most important of these are manic-depressive insanity and its allied forms, undifferentiated depression, involution melancholia, Kraepelin's paranoia, hysterical insanity, and the psychasthenic and neurasthenic states. The most common of these is manic-depressive insanity and it is this form which we wish to discuss.

Manic-depressive insanity is manifested by attacks having a double characteristic, a tendency toward recovery without intellectual enfeeblement, and a tendency toward recurrence. There are three types, the maniac, the depressed and the mixed. A description of these types is outside the scope of this paper. It is a common form of insanity, about 15 per cent. of all commitments falling into this class. Heredity is present in 80 per cent. of the cases according to Kraepelin(5). One of the most characteristic facts is that maniacal attacks are almost invariably preceded by periods of more or less depression. Another significant fact is that these people do not perceive the phenomena of the external world in their true aspect.

It is a matter of common observation that some women, who are not insane, who have pelvic disease are apt to have periods of depression, or the blues, of varying intensity. These attacks often disappear when the pelvic pathology is removed. The difference between the blues of a sane woman and the depression of a manic-depressive is often only a question of degree. This depressing effect of pelvic lesions may be just as pronounced in a woman with a handicapped psychic system as it is in one who is normal. We know that the brain is constantly receiving impressions from the external world and that a normal individual reacts in a manner which we consider normal and that an individual who has manic-depressive insanity reacts abnormally. We also know that certain individuals break down under the strain of external conditions. We also know that neurasthenics are more susceptible to internal or somatic impulses than normal individuals. Therefore it is quite possible that manic-depressives are influenced by pathological impulses arising in the pelvis. We know that the pelvic viscera are richly supplied with fibers of the sympathetic and autonomic systems and we may assume that disturbances of these systems have some effect on handicapped psychic systems.

The skeptic will at once confront us with the fact that the attacks are characterized by a tendency toward recovery. This is undoubted, but what brings on the attacks? Of course there is the

tendency to recur but in a great many cases some direct exciting cause can be determined. A single drink of whiskey has brought on attacks. Emotional strain, physical strain, the strain of labor and the puerperium have all been found to be exciting causes. It may be that the constant irritation of pathological somatic impulses acting on a handicapped psychic system may precipitate an attack. Our idea was to see if we could shorten the attacks and increase the period of sanity between the attacks in women who had manic-depressive insanity by removing any pelvic pathology which might be present. This of course will take some time as individual cases must be studied for periods of some years. However our results have been of such a nature as to justify certain fairly definite conclusions.

Taussig has pointed out that pelvic lesions are more frequent in women with manic-depressive insanity than in women with other psychoses. This is true, but may be accounted for, partially at least, by the fact that these women are discharged from the hospitals when they have recovered from an attack and while at home are exposed to the etiological factors of pelvic disease.

In this series of cases it was found that depression was more often met with than mania. This corresponds with Broun's findings, 78 per cent. in his cases, 70 per cent. in ours. The most common lesions found in the cases of King's Park were lacerations of the cervix and perineum, retroversions and retroflexions and the results of inflammatory processes. Some new growths were found but the proportion is small. A certain proportion of the cases began to improve immediately after the operation and in some the improvement was so rapid that we believe that the operation had something to do with it.

The previous report which covered the first 100 cases operated upon included twenty-six cases of manic-depressive insanity. These are reviewed again in this discussion. From May 1, 1908, to Dec. 31, 1915, 1064 women with manic-depressive insanity have been admitted to the King's Park State Hospital. These have all been examined, either by myself or by the resident on the gynecological service. Of these 160 were found to have lesions which required operation. Many others had local treatments instituted. On account of the difficulty encountered in obtaining permission, from the relatives, to operate only fifty-six of these have been operated upon. Thirty-six of these have been discharged as recovered. Six have been readmitted with other attacks and will be discussed later.

The following table shows the time which has elapsed since the operations upon the thirty cases which have not been readmitted.

1 yr.	1½ yr.	2 yr.	3 yr.	4 yr.	5 yr.	6 yr.	7 yr.	8 yr.
3	2	4	2	7	4	5	2	1

Twenty-five of these were operated upon during their first attack and it remains to be seen whether they have other attacks, and, if they do, what the character and length of the attacks are and how long they remain sane between attacks. Four cases were operated upon during the second attack and one during the third. These are abstracted briefly:

1. M. O., operated upon during second attack for retroversion. Three months between first and second attack, six years since second attack.

2. C. M., operated upon during second attack for lacerations of the cervix and perineum and retroversion. Four months between first and second attack, five years and four months since second attack.

3. B. D., operated during second attack for lacerations of the cervix and perineum and retroversion. Six weeks between first and second attacks, four years since second attack.

4. A. J., operated upon during second attack for retroversion. Twenty-one months between first and second attacks. Twenty-four months since second attack.

5. M. S., operated upon during third attack for laceration of the perineum and retroversion. Two and one-half years between first and second attack, six months between second and third, one year since third attack.

It will be seen that the first three cases have remained well for a longer period since the operation than elapsed between the first and second attacks. The other two have been discharged too recently to justify any comment.

Six cases have been readmitted with an attack since the operation:

1. R. M., admitted March 30, 1909. She was depressed, made no voluntary movements, was forced to take food and medicine, was retarded in speech and movement, had hallucinations of sight. Operation for lacerations of cervix and perineum and retroversion on May 1, 1909. She was discharged recovered on Dec. 7, 1909, the attack having lasted eight months. She remained well for four and one-half years and was readmitted on June 4, 1914 with an attack of the mixed type. She was depressed, had hallucinations of hearing and at times was violent and resistive. At present her mental condition is much improved and she is evidently recovering from this attack which has lasted nearly two years. During the

period of four and one-half years which elapsed between the attacks she had three children. The uterus at present is moderately retroverted but is easily placed in position and the perineum is considerably relaxed. Certainly the operation did this woman no good but I think we are justified in thinking that the three children in rapid succession may have had something to do with the second attack.

2. E. N., admitted Nov. 27, 1893, with an attack of the mixed type which lasted four months. She was well for seventeen years and was again admitted on Aug. 17, 1911, with a mixed attack which lasted three months. Five and one-half months after this she was admitted with her third attack of the mixed type which lasted seven months. During this attack she was operated upon for a laceration of the perineum and retroversion on Aug. 12, 1912. This attack lasted eleven months and two months later she had a fourth attack which lasted nine months. She was discharged on February 24, 1914, and has remained well for two years, a longer period than that which elapsed between the second and third and the third and fourth attacks. It remains to be seen what she will do. The only thing that can be said here is that the last attack was not as severe as the previous ones.

3. A. A. First attack in March, 1885, which lasted two months; interval of five years. Second attack in 1890 which lasted two months; interval of three years; third attack of five months, duration in 1893 followed by five years of sanity; fourth attack of one month in 1898 after which she was well for ten years. She was operated upon for laceration of the perineum, retroversion and a cyst of the right ovary during the fifth attack which lasted for ten months in 1910. She was well for five years and was admitted for the sixth time on the second of June, 1915. She was mildly hyperactive, distractable, flippant, made unreliable statements, was slightly irritable but her orientation was intact. She is still in the hospital and is almost recovered. This attack is not quite so severe as the previous ones but the operation has not helped her much if at all. The physical result of the operation is good.

4. C. B. Operation during third attack for retroversion; two attacks since; no benefit from the operation.

5. M. K. Operation for lacerations of cervix and perineum and cyst of the left ovary during the third attack; two attacks since; no benefit from the operation.

6. R. S. Operation for lacerations of the cervix and perineum during the sixth attack; two attacks since; no benefit from the operation.

It will be observed from the above abstracts that when the patient has had several attacks and the disease has become well organized that operation has little or no effect.

There have been seven cases of involution melancholia operated upon during this period which deserve mention. DeFussac(6) gives the percentage of recoveries in this psychosis as 32 per cent.

In our cases four have recovered, two are unimproved three and five years respectively after the operations and one died of myocarditis five years after being operated upon. This gives a percentage of recoveries of 57 per cent. However, the series is too small to justify any very conclusive statement.

CONCLUSIONS.

1. No mental improvement may be expected to follow an operation performed on the pelvic organs of a woman who is suffering from a psychosis which is characterized by dementia.
2. An operation for the correction of lesions in the pelvis is justifiable in a woman who has manic-depressive insanity and some improvement may be hoped for if the operation is performed in the first or second attack.
3. The pelvic pathology is not the cause of the psychosis but may act as the exciting cause of an attack in a woman of neuropathic stock.
4. The effect of the operation may be an indirect one by improving the general physical condition of the patient.

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SARCOMATOUS CHANGE IN UTERINE FIBROIDS.*

BY

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THE occurrence of sarcoma in uterine fibroids was first clearly described by Virchow(1) in 1862. During the past twenty years there has been a marked increase in the number of cases reported, due in all probability to wider appreciation of its occurrence in fibromyomata and a more careful histological examination of the excised tumors.

The published statistics of the percentage of cases, in which sarcomatous changes are found in fibroids, varies rather widely. Miller(2) in a search of the literature collected 9750 cases of fibromyomata with 1.9 per cent. sarcomatous changes. Noble(3) collected 2274 with 1.4 per cent.; of the 337 cases under his personal supervision he found but two sarcomata, about 0.6 per cent. Kelly and Cullen(4) report 1400 myomata with 17 sarcomata, 1.2 per cent. Alick(5) reports 17 cases from Leipzig with a percentage of 4 per cent. Deaver and Pfeiffer(6) made a study of 345 fibromyomata and found 1.2 per cent. Winter(7) reports two series. The first 500 cases, with microscopical examination of the suspicious spots and found 3.2 per cent. The second series of 253 cases were sectioned systematically and sarcomatous change was found in 4.3 per cent. Geist(8) reported twelve cases of sarcomata in a series of 250 fibromyomata at Mt. Sinai Hospital, giving a percentage of 4.8. The last sixty-eight cases in the gynecological service at St. Vincent's Hospital have been examined by Dr. Symmers at the University and Bellevue Medical College. Sections have been made from all the tumors with particular attention to suspicious spots. Sarcomatous change was found in one fibroid.

Statistics compiled from collected reports of cases must necessarily show a more or less wide variance from those derived from a series of several hundred cases systematically examined in one laboratory. Then, too, the diagnoses from histological findings in suspicious growths must be a matter of individual interpretation.

* Read before a meeting of the New York Obstetrical Society, May 2, 1916.

Kelly and Cullen report seventeen suspicious cases in which they did not feel justified in making a positive diagnosis. Dr. W. L. Strong(9) says: "The only safe criterion for the diagnosis of sarcoma of the uterus is in filtrative and destructive growth. Mere richness in cells, mitoses and even irregularities in size of cell, do not constitute sarcoma."

The discrepancies between the figures of 1.2 per cent. and 4.8 per cent. may be accounted for in part by considering the number of cases from which statistics are computed and partly by the difference of opinion as to what shall be regarded as a diagnostic criterion for histological diagnosis. For clinical purposes it would seem that 2 per cent. would be a conservative estimate of the number of fibroids which undergo sarcomatous change. That is, 2 per cent. of the fibroids in women who have symptoms which lead them to seek surgical aid, and not of the total number who have fibromyomata.

Etiology.—Unfortunately nothing but negative results have as yet been obtained in the study of the etiology of malignant growths. These sarcomata occur most frequently after the menopause, though cases have been reported in young women between the ages of twenty and thirty. They have been found in both single and married women.

Pathology.—The macroscopic changes are usually so slight that they are seldom recognized. The growth may be diffuse, pedunculated, cystic or racemose. The racemose form of the cervix; diffuse, friable and bleeding, simulates cancer. Malignant growths are found subperitoneal, interstitial and submucous.

Schreiber(10) says that metastases in otherwise operable cases are rare but that the growth may spread with lightning rapidity to the surrounding pelvic structures. Three of Kelly and Cullen's seventeen cases coming to autopsy showed metastases. Henricke(11) reports a case with extreme thrombosis of the veins of the right broad ligament and the right spermatic vein, extending almost to the level of the kidney. The sarcomatous thrombosis was formed not through coagulation from the sarcoma cells which had their origin in the connective tissue of the fibromyoma but through degeneration of the adventitia of the vessel wall and outgrowth into the lumen of the veins.

It is unusual to find primary sarcomatous change in more than one area of the myomatous tissue. These changes are described as having their origin in the interstitial tissues of the fibroid, the adventitia of the blood and lymph vessels and from the muscle cells.

Those which develop from the interstitial tissue or adventitia are called myosarcomata. They are tumors with two distinct components, a myoma and a sarcoma, both growing independently. The sarcomata which develop by changes from normal muscle cells are called myoma sarcomatodes. They are myomata that have become sarcomatous. Williams(12) was first to describe the latter variety and Geist has traced the transition in two of his cases.

Macroscopically, when the lesion is distinct enough to be recognized, it presents a yellowish-white homogeneous gelatinous tissue replacing the pinkish-white tissue of the myoma, with its coarse fibrous arrangement. At times the sarcoma has a porous appearance or it may contain large and small cyst-like spaces. Occasionally the tumor is soft and resembles brain tissue and from its surface a considerable amount of fluid may be squeezed. In advanced growths hemorrhages sometimes take place or there are areas of liquefaction and necrosis giving the tumor a mottled appearance of a yellowish or brownish color. The sarcomatous changes usually begin in the central portion of the myoma. Later pure sarcomatous nodules may be found scattered throughout the uterine walls.

Histologically, spindle cell, round cell, mixed and giant cell types are found. The spindle cell and mixed types are most common.

The clinical signs and symptoms are not distinctive. Cachexia is seldom present except in the late stages with pelvic involvement or metastases. The usual symptoms of uterine fibromyomata are present.

The diagnosis is rarely made before and in but few cases at the time of operation. As a rule, it is only after careful microscopical examination that sarcoma is found. In thirty cases reported by Gessmer(13) all were diagnosed after operation. Winter made the diagnosis in only one of eleven cases. Warnekross(14) reported seven cases in all of which diagnosis was made after operation. Two of the twelve cases reported by Geist were diagnosed during operation. The others after careful macroscopic examination.

The treatment is surgical. When sarcoma can be diagnosed or even suspected, before or during the operation, the indication is for panhysterectomy. As the glands are rarely involved, a dissection as wide as that done for uterine cancer is not indicated.

The absence of diagnostic signs and the difficulty in recognizing sarcomatous change by macroscopical examination have given rise to the practice of doing a panhysterectomy in all cases where hysterectomy is indicated for fibromyomata.

A study of the case reports of sarcomata in fibroids shows that recurrence after panhysterectomy is almost as frequent as after supravaginal hysterectomy. As metastases are infrequent, recurrence is not as common as in carcinoma. If panhysterectomy is adopted as a routine treatment for fibromyomata by the average surgeon, the increased mortality would more than offset that resulting from an occasional recurrence of sarcoma after the supravaginal operation where sarcoma was not suspected. With careful systematic examination of all fibroids in the pathological laboratory the surgeon can, when a positive diagnosis is made, perform a secondary operation for removal of the cervical stump.

It has also been recommended that a competent pathologist be present at operations for fibroids, so that, if sarcoma is found or suspected, a panhysterectomy with excision of parametria may be done.

The provision for frozen sections during operations hardly seems practical. In many of the sarcomatous cases a careful systematic search of many sections is required. The resulting delay and the difficulty of making a histological diagnosis from frozen sections compared to paraffine sections, are points to be considered in weighing its usefulness during operation.

Case Report.—Mrs. C., white, aged fifty-two, married. Admitted to service of Dr. Aspell at St. Vincent's Hospital September 12, 1915. Discharged October 27, 1915. Chief complaint: sanguinous vaginal discharge, pain in lower abdomen and back. Has been married twenty-five years and has had two children but no miscarriages. Menses began at seventeen, regular, lasting from five to six days with moderate flow. Menopause five years ago at age of forty-seven. Two years ago the patient began to have occasional "spotting" and later at irregular intervals profuse bloody discharge. Pain in lower abdomen and back began ten months ago. Well nourished, very nervous. But little if any loss of weight. Vaginal examination: outlet relaxed, cervix normal size, hard. Uterus appears to be symmetrically enlarged and about the size of an orange. Diagnosis: Fibroid uterus. Operation September 15, 1915. Supravaginal hysterectomy. The uterus, about the size of a two months' pregnancy, was bisected after removal and a diagnosis of diffuse interstitial fibromyomata of the posterior wall made. No evidence of disease in the appendages or appendix. The patient made a good postoperative recovery. Three days later a report was received, from the pathologist, Dr. Symmers, with a diagnosis of sarcomatous transformation of uterine fibroid. The following day the patient had a slight chill, her abdomen was distended and she complained of great pain in the right lower abdominal quadrant. Temperature 102.2°. For the next three days

the temperature ranged between 102 and 103.8°. She continued to complain of pain and was extremely tender over right lower quadrant of abdomen. She was again taken to the operating room on September 21, six days after the first operation. Incision was made over region of appendix and entrance was gained through thick adhesions to large pocket of pus in the region of appendix and right tube. No search was made for the appendix. The abscess cavity was drained through the abdomen and vagina by cigarette drains. On September 28, one week after the second operation, there was a fecal discharge from the incision over the appendix. The patient left the hospital on October 27. Both wounds were healed. Another operation for removal of the cervix was not thought advisable at this time.

Microscopic examination of paraffine sections removed from the growth in this case, reveals the presence of a richly cellular tumor made up of a framework of smooth muscle fibers in the intervals between which are large and small groups of round cells. The cells are intermediate in size between a lymphocyte and the ordinary cell of the large round cell-sarcoma. Each cell is provided with a small, compact, often peripherally placed, nucleus and a relatively large amount of smooth, pinkish cytoplasm. Bloodvessels are fairly numerous.

The source of the infection could not be determined. Kelly and Cullen call attention to the increased danger of infection following operations on sarcomatous growths.

Diagnosis.—Sarcomatous transformation of uterine fibromyoma; round-cell sarcoma.

I wish to express my thanks to Dr. John Aspell for the privilege of publishing the case report and to Dr. Symmers for the pathological report.

CONCLUSION.

The possibility of sarcomatous change in fibroid uteri should always be considered.

As soon as the uterus is removed during operation, it should be bisected and carefully inspected for any evidence or suspicion of malignant change.

After operation sections should be made and carefully examined by a competent pathologist.

Panhysterectomy for uterine fibromyomata is indicated only when sarcomatous change is diagnosed or suspected.

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- 40 EAST SIXTY-SECOND STREET.

ETIOLOGY OF STERILITY IN WOMEN.*

BY

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IN considering the causes of sterility in women, I thought it might be of more interest to you to give my personal experience than to discuss the subject in a general way. My cases, which have been the most carefully studied, accurately recorded and whose subsequent histories best followed up, have been private cases. I have, therefore, taken the records of these patients complaining of "*sterility*" and tabulated the result of my investigation. Some of these patients complained of other symptoms, but sterility was *the one prominent* symptom and at times the only one for which they sought relief. In all doubtful cases, the husband was examined by a genito-urinary specialist, and where he was at fault, the case was ruled out from the number given here. For illustration, if the woman had a double pyosalpinx due to gonorrhea, it matters not if the husband is sterile. The woman could not have children by that husband or any other man. If, however, I could find no definite cause for sterility on the part of the woman and the husband was sterile, the woman was absolved from blame. The term "sterile" is applicable to any woman who is in the child-bearing period in life, has sexual

*[Read before the Joint Meeting of the Washington Obstetrical Society and the Obstetrical Society of Philadelphia at Philadelphia, April 6, 1916.]

relations, does nothing to prevent conception, and does not have children. It is subdivided into primary and secondary, absolute and relative. *Primary* sterility means that the woman has always been sterile; *secondary* sterility that she was at one time and is no longer capable of child-bearing. *Absolute* sterility means the impossibility of conception, while *relative* sterility may mean that the woman has borne one or more children and does not again conceive, or that she cannot give birth to a living child. Thus a woman who habitually miscarries as the result of a uterine fibroid, may be as sterile as one who has an infantile uterus. In several of my cases, the patients have been sterile in their second marriage although they had borne children to their first husbands. In classifying my cases these are regarded as cases of sterility for that is the reason why they seek medical advice.

I have in my private records 120 cases of sterility. In diagnosing the causes of sterility in these cases, I have considered only tangible evidences. I have not included in my classification such subdivisions as obesity, anemia, alcoholism, incompatibility of temperament, abnormal vaginal secretion, thyroidism, want of sexual feeling, too frequent intercourse, etc. I feel that our ideas regarding them are largely speculative and as I cannot afford to experiment or make mistakes which can be avoided in my private work, I consider only those causes about which I feel we have definite knowledge.

Again, where there is a *certain* cause of sterility and an *uncertain* one, I classify the case under the first heading. Certain cases fall under more than one heading. As an illustration, where a patient has fibroid tumors and adherent but not closed tubes, I would classify the case under both conditions. Of course there may be room for individual opinions, as to the cause of the sterility in these particular women. All that I can assert with certainty in some of them is that the condition named was present; in some it was the evident cause of the sterility, in others, it may have been only an accompaniment.

The largest number of cases fell under the heading of inflammation of the Fallopian tubes. I know that this is contrary to the general belief, but nevertheless in my opinion it was true in my cases. Twenty-five had gonorrheal salpingitis with closure of the fimbriated end of the tubes: twelve had tubal disease (salpingitis or tubal adhesions) due to a puerperal (streptococcic) infection: six cases were due to an infection which originated in the vermiform appendix and secondarily involved the tubes: two were due to adhesions the result of an old tubal pregnancy, and one was

tuberculosis of the tubes. Thus we had forty-six cases where the sterility was due to tubal closure or inflammation.

Besides these cases, I saw a number of women who did not *complain* of sterility because they knew that they could not conceive as their uterus, tubes and ovaries had been removed for these conditions. I believe that in the future, a more careful study will place more cases of sterility in the class of tubal disease.

The next largest number of cases (thirty in number) fell under the classification of acute antelexion with evidences of a narrow or tortuous cervical canal. Many of these undoubtedly belong in some other category. Some conceived after dilatation of the cervical canal, and some in whom no treatment was instituted also afterward conceived. Some possibly had a faulty vagina or abnormal secretions, or there may have been some incompatibility of temperament on the part of the husband and wife. I believe that in most of these cases, that there is a faulty development of the uterus. These are the cases which give rise to many of the theories of etiology of sterility, are the subjects too frequently of unwarranted operations, and in whom some test like that of Hühner promises to be of value.

Fibroid tumors seemed to play an important rôle in the etiology of sterility. There were twenty-five cases complaining of sterility in which I found fibroid tumors present in the uterus. When marriage takes place after the woman has reached the age of thirty years, these tumors certainly play an important rôle in the causation of sterility. In a number of the cases repeated miscarriages had occurred; in a few, the pregnant uterus had to be removed, but in the majority, I believe that an unhealthy condition of the uterine mucosa prevented conception. In one case where the operation took place during the menstrual period, I found that the menstrual blood was regurgitating through the tubes, one of which was closed forming a hematosalpinx. I am convinced that a considerable number of diseased tubes which are found accompanying these tumors are due to the above-mentioned condition, and the sterility is due, in a certain number of cases, to this closure of the tubes.

There were eight cases of retroposition of the uterus without any other abnormality which could be detected. I have definitely convinced myself that this is the cause of the sterility in a large proportion of such cases. One patient had given birth to a premature infant six to eight years before and was anxious to have another child, but had not conceived. After an operation to hold up the retroverted uterus, she promptly conceived and bore a living child. Another patient who had been married two or more years and who

had not had a child, was found to have the same condition. Among others, she consulted one of your prominent gynecologists here, a suspension of the uterus was done and she conceived the first time sexual intercourse took place after the operation.

There were three cases of maldevelopment of the uterus (infantile uterus). One, at times, makes mistakes in such cases. I recall one woman in whom the uterus was apparently about two-thirds the normal size, whose periods were very infrequent and scanty, who had had a dilatation and curettage done with no apparent result, and who after several years conceived and bore a healthy child and who is again pregnant. But when the uterus is extremely small, and when there is little or no menstrual flow, and where the patient has never been pregnant, this can be regarded as a definite cause of sterility.

There were four cases of imperforate hymen, and two of vaginismus. In the cases of the imperforate hymen, there had never been an entrance into the vagina, and while conception is possible without this, I believe it can be put down as a definite cause of this complaint. The cases of vaginismus both conceived after I had done a plastic operation upon the entrance to the vagina. In five cases, an ovarian tumor had been removed, and in four, the sterility was due to a double ovariectomy for dysmenorrhea.

There were two cases of endocervicitis, one of cervical polyp, one of enlarged cystic cervical glands, and one of syphilis. There were no certain cases of maldevelopment of the tubes or ovaries.

You have perhaps noticed that I have not included in my classification many of the supposed causes of sterility. Narrowing of the upper portion of the vagina has been especially dwelt upon recently. I have never been able to convince myself that this condition had anything to do with sterility and I would certainly warn against operations to remedy this supposed cause without the most careful study of the case. Obesity, anemia, the x-ray, wasting diseases, and climatic conditions certainly cause cessation of the menses, at times, and undoubtedly can be considered as causes of sterility. Some of the others, such as abnormal acidity or alkalidity of the vaginal secretions, incompatibility of temperament, want of sexual feeling, spasmodic contraction of the uterine ligament, thyroidism, acromegaly, etc., I know nothing about and regard many of them as fanciful.

One or two are worth investigation; for example, sterility due to an abnormal reaction of the vaginal or cervical secretions. In regard to most of them, our knowledge is too meager to be of any value in determining their truth. Medical theories not based upon proof,

are liable to lead us into grave errors. I cannot afford to experiment upon my private patients and my statistics may appear too conservative. In regard to the etiology and sterility, the spermatozoa test of Hühner promises to be of practical value in individual cases. It has its limitations and will, in many cases, lead us into error, but it is well worth investigation if, as he says "several hours after sexual intercourse we find live spermatozoa in the cervical secretion, we can absolve the man from blame, and know that the cause of sterility is due to some abnormality higher up in the woman's genital tract." It will be by such practical tests as this by which we will make advances in our knowledge of this subject—not by *theorizing*.

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THE LESSENED FERTILITY OF WOMEN, ESPECIALLY AMERICAN WOMEN*

BY

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THE study now being made in certain countries, including our own, of the infertility of women, will throw light upon the various means of limiting the birth rate. That such practices have greatly reduced the birth rate in the United States, especially among native women, is admitted by nearly everyone with interest enough in the subject to read available literature. That selfishness, luxury, and perhaps erratic philosophy, are largely responsible for this condition of affairs seems to us beyond question.

In accordance with my instructions I shall briefly consider the fertility or fecundity rather than the sterility of women.

It is impossible to give a connected statement of results of studies of this question which have been made in the more civilized countries. The number of children born has been tabulated in several countries, but until within a comparatively short time no analysis has been attempted. France made the first definite effort to probe the subject from 1900 to 1906, and this country since that time has developed some features of our 1910 census which, however inadequate, give promise of more reliable and extensive work in the future.†

It has been shown by these studies that our native population is

* Read before the Joint Meeting of the Washington and Philadelphia Obstetrical Society at Philadelphia, April 6, 1916.

† See Hill, J. A., *Quart. Pub. Amer. Statist. Assn.*, Boston, Dec., 1913.

fast approaching a standstill; that we are depending upon immigration to populate our vast estate, and that our native women are not willing to give birth to such large numbers of children as did their parents or grandparents. The decline of the birthrate in the United States among native women is now comparable to that of France, where the birth rate exceeds the death rate only by a narrow margin. The population of France a century ago exceeded that of Germany, and in the time of Louis XIV that country had 35 per cent. of the entire population of Europe. Now she has only 13 per cent., and a population of 40,000,000 to Germany's 65,000,000. Another striking fact is apparent in view of our assimilation of the various elements of foreign peoples who come hither, namely, the decline in their fertility. Foreign women of the poorer classes as a rule are fruitful. There is only one in twenty infertile in such portions of this country where statistics have been carefully kept and studied. Alongside of these are our native white women, of whom one in eight is childless. The result of residence in America is shown in the second generation of immigrants, for the fertility is reduced to 5.3 per cent. from 6.5 per cent. There are 13.1 per cent. of our native women, both parents having been born in America, who are infertile. Certain European peoples, for instance the Poles, who come to this country, have 6.2 as the average number of children in each family. The average in French Canadian families is 5.6 per cent., while in native American families there are two or three children.

The very atmosphere in some States seems to favor infertility, for the negro women (who are notably prolific) living in northern States are following the examples of the whites. The number of negro women having no children (in the States where these studies were made) scarcely equals the native whites, although women who are not infertile have a larger number of children than the white women.

As to the relative tendency to have large families, the United States stands very low in the scale, as may be seen by reference to the accompanying scale:

Polish	60.9
Canadian French	53.0
Danish.....	39.6
Italian.....	37.0
Austrian.....	37.0
French.....	32.0
Swiss.....	31.0
German.....	30.0
Scotch.....	20.0
English.....	18.0
American.....	9.9

Here we have a place at the bottom of a long list of countries arranged according to the number of families having five or more children. The Canadian French have 53 per cent. of such families and Poland has 60, the latter leading all other countries, while America (the U. S. A.) has 9.9 per cent.

The study of the infertility of American women and their high percentage of sterility by the late Dr. Geo. J. Engleman, has left but little for us to add from recent literature, save what we quote from the United States Census. Engleman wrote that "in the early days of our country's history eight or nine children were born in each family. A century ago the number had decreased to four or five, and at the beginning of the twentieth century there *are* only two children per family among the native whites." The families with one child are also more numerous here than elsewhere, with the exception of France. Here is positive evidence of intervention or prevention of some kind, rather than of sterility due to disease.

The late Carroll D. Wright made a study of highly educated women which showed that married college women, in both England and America, are less fertile than most others, their average number of children being 1.3 to 1.6 per cent. Women of the same social class, not college bred, had a higher rate of 2 per cent.

These tables have been selected from those published in the *Quart. Pub. American Statistical Assoc.*, Boston, December, 1913. The studies reported in this journal are made by Mr. J. A. Hill, chief statistician of the Bureau of the Census, assisted by M. A. Parmelee. In order to compare the fertility of native- and foreign-born women in the United States, the work of the National Immigration Commission was used, which in turn took up and considered the three last Census reports, 1890, 1900 and 1910. They selected counties of Ohio and the city of Cleveland. Also, counties of Minnesota and the city of Minneapolis. Finally, the entire State of Rhode Island was canvassed, probably because the population is largely urban, and the native and foreign elements are nearly equal. The women, as a rule, were living in the second decade of married life.

White, native parentage.....	15.953
White, foreign parentage.....	61.816
White, native without children.....	2.097
White, foreign without children.....	3.541
White native women without children.....	13.1
White foreign without children.....	5.7
Negroes tabulated.....	663.0
Bearing no children.....	136.0
Percentage.....	20.5

THE CAUSE OF THE LESSENERED FERTILITY OF AMERICAN WOMEN.

It is useless to ascribe our lessened birth rate to disease as a principal factor. Several authorities claim that 12 per cent. of sterility due to disease will include all disability of this kind. Neither have we proof that venereal disease is increasing as rapidly as the birth rate declines. It is generally admitted that the relative sterility of men is as one in seven or eight, hence the husband frequently comes in for his share of responsibility for this state of affairs. But whatever the supposition as to the relative sterility of the sexes, we must admit, and it appears to be the prevalent opinion, that limitation has become well-nigh universal among the prosperous and educated classes everywhere.

We know that the most prolific period of married life is from twenty to thirty years, or the first decade thereof. We also know that marriage is almost impossible at this age among the educated classes, because the present demands of our educational system require eight or ten years longer than was the rule fifty years ago.

The solution of the problem is no longer one to be studied by medical men alone. It must inevitably become the concern of all patriotic citizens of mature mind. One of the tendencies of our people is to rush along the highway leading to financial success. This, indeed, is the time of the "strenuous life." The glitter of wealth, the determination to get rich quickly, the intensive business and educational methods of the day, each and all are opposed to the growing of large families. This is true of women largely because they are becoming independent of men and of marriage. They have "careers." They are rapidly throwing off their willingness to bear children, and both women and men easily fall before the specious philosophy of Malthus that too many children may become a burden to the State and to society. Large families were reared when luxury was not the rule, but rather when the home and the fireside was more attractive than the diversions of the time, which now do much to disrupt the intimate association so essential to conjugal love.

Another influence has been at work which appears to me most powerful in the decline of the birth rate, namely, the lessened or diminishing influence of religious denominations. The French Canadians, who generally belong to the Roman Catholic church, are very loyal to its teaching as regards the birth of children. The difference is striking between them and the Canadian English and those in the mother country, where, it is well known, the church has lost its former prestige and its influence upon the mass of the

people. But whatever the Catholic church may have done or has failed to do, there is more free agency everywhere and more consideration of individual comfort than obedience to religious duties or duty to the State.

THE DUTY OF PHYSICIANS

In view of the complex problem which has produced these results, it is difficult for us to comprehend the whole question or to announce a cure for the evils we have mentioned. Perhaps another generation may find a remedy, or at least make a correct valuation of the apparent dangers to our national welfare.

In the meantime, there is a degree of probability but strong pressure may induce many professional men to advise contraceptives, or to intervene in order to gratify the whims of women who imagine that they are physically unable to bear a child, or more than one or two children, when they are perfectly competent to do so. We know that some physicians advise against impregnation subsequent to either trachelorrhaphy or perineorrhaphy. We know that women are frequently told that after the birth of one or two children the displacement may be cured and the lacerations repaired, with the intimation that such repair work must not be subjected to the test of subsequent parturition. The attitude of the physician may have much to do with the limitation of families in this way as in many others. There is room for the belief that professional opinion is gradually changing in the direction of popular opinion and that it, too, follows the "easiest way."

STONELEIGH COURT.

THE INDICATIONS FOR AND ADVISABILITY OF ARTIFICIAL STERILIZATION.*

BY

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THE controversy between theology and medicine concerning the rights of the patient and the physician's duties to his various maladies is as old as the history of medicine. Where science has shown undeniable facts theology has given ground begrudgingly toward the real protection of the patient's interests. The sanctity of the human

* Read before the Joint Meeting of the Washington Obstetrical Society and the Obstetrical Society of Philadelphia, at Philadelphia April 6, 1916.

body has always held the reverence of men to the extent that inherently we shrink from desecrating either the living or dead form.

In preparing this paper I have experienced the strange change of opinion from one of rather enthusiastic belief that artificial sterilization should be freely practised to a wonderfully more consistent opinion that the indications for such procedure are very few, but when present are decidedly advantageous. The subject is one in which no broad rule can apply but only very particular cases may be so treated and then only with many safeguards.

In his writings upon sexual hygiene after detailing the ill effects of intercourse with efforts to protect against conception, Edgar says: "There is, however, one course possible, which may be recommended as both safe and efficacious, which can hardly be abused. This is obliteration of the Fallopian tubes for a short extent by the vaginal route. This is unobjectionable from any standpoint, and yet I fear it hardly constitutes a solution of the problem."

There are legal grounds for the support of sterilization operations. The following States have enacted laws allowing sterilization of defectives and making the sterilization of criminals obligatory. These are Indiana, Washington, Nevada, New Jersey, New York, North Dakota, Michigan, Kansas, Wisconsin, Texas and California. Pennsylvania has three times passed such statutes only to be vetoed by two governors in 1905, 1909 and 1911. To Pennsylvania belongs the claim of priority for such legislation, since the Indiana act, the first to become a law, was not passed until 1907. The first attempt was made in Pennsylvania in 1905.

At present the laws of this caliber are very much alike, but in two States only have operations been done, Indiana and California. The truth is these laws are imperfect and in two instances have been repealed as unconstitutional, in New Jersey and Iowa.

The problem of personal liberty has been brought to view in this matter in a conflict with the eighth Constitutional Amendment of the U. S. which reads as follows:

"Excessive bail shall not be required, nor excessive fine imposed, no cruel nor unusual punishment inflicted."

There is also conflict with the fourteenth Constitutional Amendment which guarantees equal protection to all.

With regard to criminals this seems cruel punishment inasmuch as the possibility of inheritance is much in doubt with regard to both insanity and crime. It is believed that the laws of psychiatry, formerly accepted to prove the surety of inheritance in mental

tendencies will be rewritten to the effect that what has formerly been ascribed to inheritance will be seen as due to environment.

Hence to quote White we find "It will be seen that by constructing elaborate family trees, reaching back over several generations it may not infrequently be possible to trace a bad trait and see its culmination in certain individuals; but that is a very different matter from predicting what the next generation is going to show. It is the difference between explaining and forecasting.

In an article, "Inheritance as a Factor in Criminality," Drs. Edith R. Spaulding and William Healy report "In the 1000 cases we have reviewed, we carefully sought for evidence of *direct* inheritance of criminalistic traits, as such. However, in no one case of the 1000 have we been able to discover evidence of antisocial tendencies in succeeding generations without also finding underlying trouble of physical and mental nature or such striking environmental faults as often develop delinquency in the absence of defective inheritance."

Continuing they say, "All told, the indirect influence of heredity on criminalism in our cases appears to be that in 35 per cent. there is predominantly a transmission of mental and physical defects and that in 9 per cent. inheritance is partially responsible."

Concerning our ability at the present time to ascertain those who should be sterilized, Dr. Wm. A. White, Superintendent of the Government for Insane, Washington, D. C., says, "A word in this connection with regard to negative eugenics. There has been a tendency of recent years to pass laws providing for sterilization of certain classes of defectives and delinquents in the community."

"The amount of knowledge of an individual that would make it scientifically justifiable to sterilize him is an amount that is rarely obtainable in so far as I know where this work has been done, there has been little or no effort to obtain that knowledge, whether its desirability was or was not appreciated. The only condition where this method might theoretically be justified, with the minimum amount of knowledge, would be conditions in which the disorder from which the person suffered was dominant, and therefore, would be transmitted to the progeny. We must remember, however, that even in *dominant* traits, union with healthy persons may produce healthy children, and unless there are going to be at least two children, no prediction is justifiable."

"If the mating were productive of only a single child, as so many matings are these days, there is no reason why the child should not be the well child, and if well, it might grow up to useful citizenship.

"To take the responsibility of intervening at this point and preventing such an issue is a very grave matter and warrants a much profounder knowledge than we can claim at present.

"On the other hand, if the trait is *recessive* only a very careful examination will make that clear, then only rarely will it be anything more than a probability. To sterilize such a person is a still graver responsibility, for a mating with healthy stock will eliminate the disease without even any sick progeny as the price."

Dr. Henry H. Goddard in work done in connection with the Russell Sage Foundation in speaking of sterilizing feeble-minded persons, teaching them to work, and then sending them to their homes, obviously a long and laborious task, says: "We thus see that in the present status of the problem, neither of the plans, segregation nor sterilization will solve the problem at once but since both are good, and both contribute somewhat to the solution, the only logical conclusion is that we must make use of both methods to the fullest extent possible." Continuing he says, "The situation is fast becoming intolerable and we must seize upon every method that is suggested and offers any probability of helping in the solution of the problem. In other words, it is not a question of segregation or sterilization but of segregation and sterilization."

Dr. Martin W. Barr, Chief Physician to Pennsylvania Training School for feeble-minded children says, "There is nothing that clings through generations like insanity, so related as it is to idiocy; and after all the difference is one of degree rather than of kind. In a careful study of insanity covering a period of nine years based on investigation of 138,500 individuals 20.5 per cent. was found due to heredity." He also says that it is estimated that there are 15,000 feeble-minded in the State of Pennsylvania and one in each five hundred throughout the United States.

In view of the fact that the information at hand concerning hereditary influences and the power to transmit them is in doubt, as shown by expert opinion and that these experts differ widely it would seem that at present mental defect should not constitute ground for sterilization, since scientific and legal right is in doubt.

Investigators in embryology and also in obstetrics seem to show that the rate of so-called spontaneous abortion occurs once in six pregnancies. Any standard obstetric work in its chapters on the pathology of pregnancy will give the indications for and describe at length conditions that demand emptying of the uterus either after curative treatment has been instituted, or forthwith as soon as diagnosed.

Certain systemic, infectious and constitutional diseases seem prone to cause abortion or premature labor in the majority of instances when pregnancy occurs and yet this condition will result nearly as readily as in the normal.

Recognizing these points it seems that nature is a prolific provider, but pathologic conditions have caused an inordinate waste. It is also true that such efforts are attended with some severe penalty by the human economy. It would seem that diversion of these tendencies would result in advantage.

It is true that there is a stronger tendency at this time toward terminating pregnancies, for just cause in the unfit, than ever before. This is legal, ethical and scientific. It meets religious opposition properly and when not based upon the soundest scientific necessity should be met by stronger objection from the profession than religious sects could ever offer. However, does not the need of therapeutic abortion, done with religious conscience, admit the probability that there are those who are unfit to go through pregnancy and labor? I think so. There is not the merest suggestion here that a sterilizing operation may be a less formidable undertaking to the patient than emptying of the uterus, but to say that, in some instances, where abortion will be necessary, sterilization can be done and thus anticipate that risk without adding but reducing ultimate danger in particular instances. Individualization is the keynote upon which this matter rests.

Investigators of psychology and neurology with derision decry the practice of continence in the married. The younger Keyes likens the situation to that of the wild beast fed without meat. He says that for the most part there is no need of sexual gratification, although the appetite is present, until the first taste of carnal food. After initiation there is a different mental and nervous complex, a near necessity. Contact without normal expression produces defense reactions that tend toward mental and nervous instability. The sexual act was originated in all its attraction for the purpose of procreation, but also as a means of expression of the deepest emotion that souls possess.

Unquestionably there are those who are unfit and those mentally deficient so that offspring would not be desirable. In such instances if sexual life is entered into, emptying of the uterus will spontaneously occur or should be induced in by far the largest portion, according to the conditions as they occur. There are particular instances, however, where emptying of the uterus is not to be chosen for

sterilization will protect the physical and moral life of those whose strength cannot surmount the strain of pregnancy and labor.

The classes of cases in which sterilization may be considered are:

1. Conditions where the severity of the lesion warrants sterilization.
2. Conditions that are so fraught with danger when the strain of pregnancy and labor are added and particular experience has been known to be attended with calamity.
3. Patients who have done their part toward procreation successfully and in whom other operative procedures are necessary that makes sterilization also possible and attended with no additional risk.
4. Skeletal deformities presenting absolute disproportion between the passenger and the pelvic canal.

Within these groups are the tuberculous patient, the one who has severe cardiovascular upset during pregnancy, the kidney group, principally Bright's, attended with the kidney of pregnancy, the faulty metabolic conditions attended with diabetes.

Standard authorities on obstetric treatments are pronounced in their teaching that the tuberculous patient, the typical heart patient and the kidney case should not marry and should not bear children. What should be the course of procedure if any one of these conditions obtains when the prospect of pregnancy is likely, for instance after marriage, when no evidence of such had been formerly suspected? The operation to effect sterility is not of major importance and may even be done with cocaine. In well-guarded conditions it should be advised.

Osler in his writings on tuberculosis has said that, "There is much truth in the remark of DuBois: If a woman threatened with phthisis marries she may bear the first labor well; a second with difficulty, a third never."

The effect of pregnancy upon tuberculosis is universally believed to be grave; failure occurring after delivery, while the course of pregnancy is oftentimes without serious moment. Tuberculous women are known to conceive rapidly, giving birth to well-developed normal children. There is little evidence of intrauterine infection of the fetus, the children when infected, evidently contract the disease from contact with the mothers. In view of the universal failure of tuberculous women following delivery, sterilization would seem to be plausible, especially in incipient cases, when operating for some other indication.

Concerning the valvular heart lesions that become decompensated

during pregnancy Williams quotes various series of cases estimating maternal mortality to be from 6 per cent. to 60 per cent. according to different investigators. His own view seems to be optimistic. He says, however, that women suffering from heart lesions should oftentimes be dissuaded from marriage and child-bearing. On the other hand, it is his opinion that such cases oftentimes present agreeable surprises, although the seriousness of this lesion should always be kept in mind. In view of the fact that the decompensated heart lesions, especially double lesions, do present serious complications to labor sterilization may well be done in such instances. This is particularly true when a former labor had been attended with serious circulatory failure, jeopardizing the patient's life or requiring emptying of the uterus. In such instances chronic heart lesions should be looked upon as indications for sterilization on account of the condition itself or when some other operation is being done.

DeLee in speaking of decompensated heart lesions and advanced kidney disease, nephritis, says: "These patients should not marry, but if they do should not conceive." He says, however, that both conditions tend to premature labor, and that the ultimate risk is great.

Defective kidneys are seriously injured by the advent of pregnancy. The promise of recovery by induction of abortion in such cases is productive of disappointment, the disease seeming to have been given added impetus by pregnancy. Where nephritis exists, especially **after experience** of disquieting nature in the course of pregnancy terminating in spontaneous or therapeutic abortion, excision of a portion of the tubes may be done and will greatly insure the welfare of such sufferers. It is obvious that no such undertaking could be considered as an elective procedure, the necessity of such immediate shock would tend to offset too greatly the future advantage. The nephrectomized patient is not a candidate for sterilization unless the remaining kidney is decidedly crippled. Emptying of the uterus should answer her need should it come.

The disorders classified as the toxemias of pregnancy do not warrant prophylactic excision of portions of the tube. There is not enough evidence to prove their successive appearance and the serious cases may be better handled by therapeutic abortion.

With regard to skeletal deformities much change of opinion has come about. With the improved technic of Cesarean section and pubiotomy it is much less urgent to arrange that such patients cannot conceive. Within the proper surroundings absolute pelvic

contraction and spinal deformities do not constitute indications for sterilization. This is certainly so with the first pregnancy, since although the fetus be delivered in prime condition other offspring may be desired. Even if the patient so desires she should be dissuaded after the first Cesarean at least. Should two sections prove necessary the patient's wishes may be given first consideration and the operation done at the time of Cesarean.

Osteomalacia constitutes the only positive indication for sterilization *per se*. In this country this condition is a rare occurrence. It is a peculiar coincidence that this tropho-neurosis is of such severity in producing skeletal deformity as to demand immediate salpingo-oophorectomy. It is also strange that it offers the only instance among these conditions requiring sterility that removal of the ovary and not excision of the tube is necessary.

There is a large group of cases that deserve relief from further child-bearing. These are women who have well done their share toward procreation. In such instances where four, five or six children are living and a repair operation is being done while these patients are still in the child-bearing age, they should be allowed to divert their attention to the more perfect care of these already born. I feel that this is right where it is the patient's choice. For the woman who seeks to avoid the anxiety and danger of pregnancy for convenience only of course no consideration is deserved.

The attendant circumstances under which such practice may be undertaken are:

It shall be done with the patient's or guardian's approval.

With the exception of osteomalacia no disorder is of itself sufficient to warrant sterilization without at least one trial pregnancy and labor.

It may be done when an individual patient's experience with pregnancy and labor has been shown to be a serious menace to health and life.

Those women who have thoroughly done their part toward child-bearing, in whom other defects demand operative procedures that would also allow sterilizing operations to be done, should be protected from further efforts.

For the majority of instances where this practice is to be instituted consultation should be necessary.

Nature has taken it upon herself to provide spontaneous sterilizing processes, gonorrhea and syphilis. The former effectively sterilizes a large deficient class, the prostitutes; the feeble-minded is likely to choose one infected as her sexual consort and is thus much more

frequently exposed. Syphilis insures the success of the former by aborting those unfit to finish the task of pregnancy and later parenthood.

The other indications for birth control, namely, the heart case, the kidney case, the metabolic case are prone to abort spontaneously; hence, there is a natural sterilizing process which belittles the efforts of humans.

Inasmuch as the first order of nature is reproduction, has man in the absence of undeniable fact upon which to base his action the moral or technical right to reduce this fundamental principle? In the presence of positive lesions of gravity, with previous experience of near fatal termination, sterilization is like any other therapeutic procedure and should be advised when it saves life or preserves health.

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TUBERCULOUS PERITONITIS—AN ANALYSIS.*

BY

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It is the writer's opinion, reinforced by a review of the literature, by conversations with other operators, and from observing a number of cases of tuberculous peritonitis, personal and otherwise, that this lesion has received but confused attention from gynecologists; and that its recognition constitutes a neglected study in our particular field. The only gynecologist in Brooklyn who, to my knowledge, ever gave this type of tuberculosis any real serious thought, was the

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late Dr. George McNaughton. At the time of the reading of his paper before the Brooklyn Gynecological Society, he lamented the fact that so little attention had been directed to the careful consideration of this affection. Gynecologists have, in late years, given all of their thought and time to the cure of uterine prolapse, the cancer problem, the devising of the best operative technic for the correction of uterine retrodisplacements, and to plastic procedures for the restoration and repair of anterior and posterior vaginal walls. We have had some seven discursive years of this, the pendulum swinging vigorously in all directions, but we can't positively diagnose tuberculous peritonitis. And yet the claim is made that the gynecologist has exhausted every subject of interest in his specialty.

Our attention has been strongly directed to a more serious analysis of this type of tuberculosis from a study of two cases in our service at the L. I. C. H. Never in our experience were there two such dissimilar cases of the same lesion. And, as was afterward noted, though both bore all the hall-marks of tuberculosis, yet, not until both cases went to operation and were sectioned, was the condition diagnosed. One was stout, red-cheeked, a picture of health, and engaging in outdoor sports: the other, emaciated, febrile, profoundly weak, and with marked abdominal distention. On section, both presented a peritoneum studded with miliary tubercles. The stout subject had little free fluid, a few adhesions, but a tuberculous appendix. The emaciated subject showed a much distended abdomen, which on section revealed much free fluid, very extensive adhesions, and the tuberculosis involving uterus, ovaries, and tubes and extending well up under the liver. There were no encysted nor encapsulated collections of fluid. In the stout case, the appendix was removed, the fluid sponged out, and the abdomen closed without drainage. A fecal fistula promptly resulted. Further convalescence was uneventful. I expected to reoperate and close the fistula, but, one day, the patient after a severe set of tennis began to vomit and showed all signs of intestinal obstruction. On removal to the hospital and reopening the abdomen, there were absolutely no signs of tuberculosis such as tubercles or fluid. The end results, however, were present as dense intestinal adhesions. The intestines were acutely injected from an acute fulminating peritonitis which was due to the fact that the fistulous cecum had evidently been torn from the abdominal wall allowing the escape of intestinal contents into the peritoneal cavity. Extensive drainage, with repair of wounded surfaces proved unavailing, the patient dying in twenty-four hours, profoundly toxic.

The thin, emaciated case with general pelvic tuberculosis of the uterus and adnexa, was panhysterectomized, the fluid sponged out, and the abdomen closed without drainage. After operation hygienic measures were instituted, the patient remaining on the roof the whole day. In addition, this was combined with supportive remedies. The case grew progressively worse, emaciating rapidly and with constant leakage of fluid through the vaginal vault incision. Three months later she died. Autopsy revealed pulmonary tuberculosis, with general tuberculous peritonitis and extensive adhesions. The cecum was adherent to the scar of the hysterectomy in the vaginal vault. There was a large encysted abscess of a circular form, walled in by the ascending, transverse, and descending colon and omentum. This abscess ran from the vagina up under the liver, across under the stomach, and down again to the vagina. It was an encysted collection of pus as is frequently found in these cases.

Now please note that in one case the appendix was removed and a fecal fistula resulted. In the other case there was a panhysterectomy, and this was followed by immediate and constant leakage, although the vaginal walls were tightly sutured. Both cases were not drained. I call your attention to these particular facts, as the discussion will probably be directed to this phase of the operative technic.

With these cases in mind, our interest was stimulated to read up a much neglected subject, and we are the gainers thereby. We trust that this short brochure will be a help to those who may later encounter a case of tuberculous peritonitis. As in missed ectopic, when we make a mistaken diagnosis, and on opening the abdomen find an unruptured or a ruptured gestation sac, and when afterward we review the history more carefully, there is the whole picture before us. The history was fairly crying aloud, 'ectopic,' and we wouldn't hear. So in these two cases of tuberculous peritonitis, neither one was diagnosed prior to operation, and yet a later reading of the histories showed us plainly and clearly, that these two cases could not have been anything else. I might mention here that the first case was diagnosed as chronic appendicitis, and the other, as some malignant intestinal lesion. Both cases had been seen, also, in consultation by two other medical men, and tuberculosis was not mentioned nor suspected.

Our study of the literature was confined almost entirely to symptomatology, diagnosis and treatment, with the reading of numerous case reports. We will endeavor to give you a composite synopsis of this study.

Tuberculous peritonitis is always secondary to some other tuberculous focus and may be either of the wet or dry variety. It is in the former that surgery, though at times empirical, has its successes, if any. The lungs may be the starting point from which the bacillus tuberculosis gains entrance into the blood stream and is carried to the peritoneal cavity or to the tubes. Baumgarten thinks that Fallopian tube tuberculosis is never primary, but that the tube has been infected from its peritoneal surface. The peritonitis may be secondary to lesions of the bladder and rectum or develop from tuberculous intestinal ulcers. A tuberculous appendix is a frequent cause. It may develop from a tuberculous uterus, vagina, or vulva, but these entrances of infection are rare, as the infection usually comes from above downward. It is a disease of early life, uncommon after the age of thirty-five, and more frequently occurring between the ages of eighteen and thirty-five. Lupus and tuberculous joints are never associated with tuberculous peritonitis. The bacilli are rarely discovered in the ascitic fluid, nor in encapsulated collections of pus. They may be abundant in the cheesy foci or can be detected if a tubercle is crushed and freshly examined on a cover slip. It is necessary, oftentimes, to make an exhaustive and painstaking search before the bacillus can be found.

Symptomatology.—Tuberculous peritonitis may begin acutely, or may be chronic from the start. The patient begins to have malaise, gastrointestinal prodromes such as colic, with alternating constipation and diarrhea. The first fact to attract her attention is the enlargement of her abdomen due to the serous effusion. In a young woman with no history of uterine or tubal infection, she shows symptoms of a chronic pelvic inflammation. This fact alone ought to be sufficient to put the observer on his guard and arouse his suspicion as to the probable etiological factor present. The onset is gradual and not acute as in acute pelvic infections, but the *progress is persistent with no periods of improvement*, as in the case of a classical pelvic inflammation. Whitridge Williams says that a large proportion of adherent tubes and ovaries removed on account of pelvic inflammation are, in reality, tuberculous.

Emaciation is also gradual but persistent, and there are usually evidences of tuberculosis elsewhere. The tuberculin test is of material aid in doubtful cases, avoiding the ophthalmic. In one of my cases, the von Pirquet gave the most violent and startling reaction I ever witnessed, but I thought, at that time, that the lungs were the seat of an incipient tuberculosis.

While emaciation is generally present, the patient may present a

picture of blooming health and robustness, and yet have a most extensive tuberculous peritonitis, as in one of my cases. Eighty per cent. of Kelly's cases were of this type.

Abdominal pain of varying character and intensity is the most constant symptom, but the most characteristic and prominent symptom is *painful urination*, generally *burning during micturition*. Tympany is nearly always present. Temperature may or may not be associated with the disease. As regards the menstrual history, nothing definite nor characteristic was noted in the literature.

Diagnosis.—It is sometimes impossible to form an accurate diagnosis, as the patient's condition, if she is of the healthy or robust type, may mislead. All authors are agreed that a diagnosis should not be difficult in three types of cases:

A. Where there is extensive pulmonary involvement.

B. Where there is a persistent uterine discharge, or where the curetings demonstrate tubercle bacilli.

C. Where there is pelvic inflammatory disease associated with irregular, ill-defined masses, with fluctuation in the lower abdomen, and these masses are noted at later examinations to have changed their relations.

In this latter connection, Reed remarks that these tumors are usually omental or masses of intestines, and that they give the most confusing physical signs ever encountered. An apparently solid tumor will give tympany, its confines and relations will change between examinations—tympany will persist in the flanks despite an effusion. This is due to intestinal and omental massing, and was graphically and forcibly illustrated in my last case which was diagnosed as malignant. Here tympany differed in the same location at different examinations. The location of the fluid wave varied. The physical signs on the day of operation, even, were quite different from those of the preceding day, and this change did much to confuse us. For to tell the truth, no other examiner could account for the change either. We regret that we did not call one of the internists as an additional consultant. Perhaps the confusion could have been cleared up.

Errors in diagnosis have been reported as follows: tuberculous peritonitis was mistaken for simple pelvic peritonitis, pyosalpinx, carcinoma of the ovary with effusion, pregnancy, multilocular ovarian cyst (Kelly and Howard, of Baltimore, each made this mistake). It has also been taken for uterine fibrocyst. One case was diagnosed as a dermoid by one surgeon and as a pregnancy by three other surgeons (Friedman). Baer reports two cases, one

diagnosed as a simple large ovarian cyst, and the other as a solid tumor. These two cases bear out forcibly what was said in regards to the confusion of physical signs. This form of tuberculosis has been reported as typhoid, an error of the internist. Osler reports ninety-six cases, thirty of which were diagnosed as ovarian cysts. I did not feel quite so badly after reading these errors, although they did not excuse me.

Treatment.—Fenger says that a fair proportion tends to spontaneous recovery which statement, in itself, is an interesting proposition with which to start discussion. All authorities agree that hygienic measures should be instituted at once and that laparotomy is the only choice, especially if the case is one of effusion. Tapping and aspiration do not give so good results. But if a patient is suspected to have tuberculous peritonitis and improves under hygienic régime, do not operate. Kelly, Mumford, Reed and Ashurst, and others, whose reports were studied, all advise operation and the doing of extensive work. Ashurst says that the ultimate prognosis is better, if some focus such as the tube or appendix is removed; yet in the same breath remarks "if intestinal sutures can be made to hold, union seldom occurs and fecal fistulæ usually result." These two statements can hardly be reconciled with each other. Murphy decries against removing the appendix in these tuberculous cases. In my first cases I did, and a fecal fistula promptly resulted. Please note how widely variant are the opinions and operative technic of different men. We have no set rule to guide us. Kelly in twenty-two cases operated on all of them and did most extensive work, some of his cases being those of general miliary tuberculosis with peritoneum everywhere studded with tubercles, with intestines knotted up into all sizes of masses, with dense adhesions, and with uterus, tubes and ovaries covered with tubercles. His operations included many different steps. In one he removed all of the omentum close up to the colon; in others, he did total hysterectomy, and yet all of his cases recovered. Every operator insists that if a focus can be found and removed without too much traumatism, that this should be done. Mayo is especially insistent on this point. And all are agreed that where pelvic structures cannot be removed owing to too dense adhesions, that no operation is the wisest procedure, simply opening the abdomen, being careful to remove all of the fluid. All serous or bloody fluid collections should be sponged out, after dropping the table to a level so as to cause the fluid in the upper abdomen to gravitate toward the pelvis. I further suggest dropping the foot of the table to better facilitate the fluid to drain into

the pelvis. Where intestines are matted into one mass, under no circumstances, must any attempt be made to separate them. Sometimes the adhesions are so extensive that this mass appears as if it were a cyst, and operators have made an attempt to remove it. If this mass is closely inspected, where the coils of intestines are agglutinated, fine, white, lines will be seen like small threads on its surface. Kelly says that the true nature of this sac may be demonstrated by striking it a sharp blow with the finger, and that vermicular motion will be set up. In one of his cases with this condition, he merely drained the abdomen and his patient is alive and well to-day. Encysted collections of fluid among the intestines should not be opened, nor even drained. Operation is not contraindicated with slight lung involvement.

In operating, the abdomen should be opened with a small incision, about 7 cm. The fat is found to be unusually pale, watery, and unhealthy in appearance. The peritoneum is very thick. The fluid removed tends to spontaneous coagulability.

When the abdomen is opened, the fluid sponged out, and no operative procedure is instituted, it is advised to leave in the peritoneal cavity, 4 grams of iodoform. No drains should be employed.

McGlinn opens and introduces oxygen into the peritoneal cavity, and appears annoyed because his pioneer work in this direction has received no recognition from surgeons, and that others have been quoted extensively as the originators of this technic. He reports six years ago, seventeen cases so treated, where after a year there was an apparent cure. Tracy supports McGlinn.

Unless there is a band shutting off a loop of intestine, or a distinct obstruction, no intestinal adhesions are to be disturbed. Even, where the intestines are adherent in a big mass, peristalsis is not interfered with, so long as normal and mutual relations are preserved. A single adhesion of a knuckle of gut is far more dangerous.

Parker Syme places the percentage of cures at 30 per cent. as a result of a comparison of many statistics, in which the cures varied from 24 per cent. to 80 per cent. Koenig reports 131 cases in which 24 per cent. were cured for over a period of two years.

Tuberculosis ranks a close second to Neisser infections as an etiological factor in the production of sterility. Howard Cummings, of Michigan, reports 182 cases of pelvic inflammatory disease, of which forty-five were sterile. In thirty-six cases, the sterility was due to gonorrhea, in seven to tuberculosis, and in two to questionable origin. Tuberculosis, like gonorrhea, seals the fimbriated ends of the tubes. The parametrium is never involved.

As regards recovery: In eleven cases with extensive operation, and all operated by different operators, all recovered. In seven cases, of different operators, with no operation, all recovered. Kelly's twenty-two cases all recovered. And some had operation and some did not. In all of the cases reported, the nonoperative did just as well as the operative.

Now these statistics and my reading of this much neglected subject have taught me a salutary lesson. First, that most surgeons are poorly read on this subject and that the literature from a surgical aspect is too scant. Just take the Index Medicus and see how much you can find in it about "Tuberculous Peritonitis" from the surgical standpoint that is of scientific value. We have no fixed guide nor standard. We are in the same position as we were before Pozzi taught us set rules for our guidance when we encountered papillomatous ovarian cysts. The pathologist knows this subject. The surgeon knows it carelessly, excepting the operative side. Kelly has written more scientifically and exhaustively about it from all sides than any other American surgeon, but Kelly knows pathology, and he is also a brilliant operator. Perhaps some German, whose work on this lesion has escaped my notice has written conclusively, but I could find no mention of his name.

The digesting of all this literature points out this one fact in the operative work: With no great peritoneal disturbances, with slight adhesions, few or no tubercles, we are justified in removing one tube if it is the focus, or both, if the foci. But nothing which I have read settles the question as to whether we should operate or not. The chances seem fairly good either way. Personally, in the future, I shall remove no appendix with tuberculous peritonitis present. With extensive peritoneal involvement, I shall remove nothing. The let-alone policy appears to be a safe one in severe cases, merely opening the abdomen, removing all the fluid by sponging and proper table level, introducing iodoform, *and, especially important, closing the abdomen without drainage.*

In the case of the emaciated patient, I am now of the opinion that panhysterectomy was unnecessary owing to the extreme involvement of the peritoneum at the time of operation. Her tissue was of poor reparative quality as was shown by the free escape of peritoneal fluid from a vagina which was tightly closed after the hysterectomy, due to the sutures not holding, and such sutures, almost without exception, hold in ordinary cases. The mistake in her case was in doing anything but opening the abdomen, removing the fluid, and closing without drainage.

THE ENDOCRINE GLANDS IN THEIR RELATION TO THE
FEMALE GENERATIVE ORGANS.*

BY

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EVERY reaction of the normal human body to stimuli is accompanied and controlled by activity of the nervous system on three different levels, the psychic, the sensori-motor, and the vegetative. The psychic reaction produces an emotional state, pleasure, anger, fear; the sensori-motor, sensation and activity; and the vegetative, vasomotor response and glandular activity. This last-mentioned division of the nervous system is an involuntary and autonomic one, that is, it may act independently of either of the other two and its activity is conditioned by the needs of the bodily tissues at any given moment and is entirely free from our volition. In the course of its many fibers and ganglia it supplies various structures, among them the so-called endocrine glands, which under this control and direction pour out constantly or intermittently or periodically into the blood stream their secretions. These secretions have various controlling effects upon body growth, sexual development, metabolism, blood pressure, and in short, upon all vital functions. The secretions themselves have effects that are mutually compensatory or antagonistic, mutually excitative or inhibitory; and in health the different groups are constantly balanced against one another.

The vegetative nervous system controlling their activity is anatomically largely free of the tracts of the spinal cord, and its nerve trunks and ganglia are anatomically almost entirely external to the spinal cord. So that, when a recent text-book states that because a female dog whose spinal cord was divided, went through all the phenomena of heat, pregnancy and lactation, therefore, these processes were free of the nervous system and depended entirely upon the channel of the circulation, it is patently wrong. A divided spinal cord is not a divided vegetative nervous system. The conclusion is thereby vitiated. Indeed, Cannon proved that in order to get

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mobilization of sugar through stimulation by fright or other emotion—a true endocrine activity—three conditions are absolutely essential, namely, intact adrenal glands, normal liver, and undisturbed splanchnic nerves. The absence of any one produced failure in the result. Therefore, for this endocrine reaction, the intact autonomic nervous system is necessary. We have reason to believe that practically all endocrine activity depends upon similar conditions.

If we substitute in this group for liver, the female generative organs, for the adrenals, any of the endocrine glands, and for the splanchnics, the entire intact vegetative nervous system, we then have a combination similar, though somewhat more complex, whose components interact freely and constantly, producing periodic changes in widely separated parts of the body, but all of which changes have a common purpose—the reproduction of the species—the continuity of life. The absence of any one of these elements nullifies the purpose.

Let us analyze the effects of one group of this combination—the endocrine glands—upon the functions of the generative organs. At this point, it may be well to state that such effects have never been absolutely proven, they have merely been observed to take place in a large number of instances following changes in the glands and have been frequently found at necropsy. Two of the internal glands, the pineal and thymus, flourish until puberty is established, then they gradually atrophy. If they cease to functionate before this time, precocious puberty occurs; if their activity is prolonged beyond the age when puberty should occur, then amenorrhea, infantilism and perhaps even sex reversion take place. For these reasons, their secretions are presumably antagonistic to those of the ovary and will produce when administered in hyperovarian conditions, such as simple metrorrhagia, excess of libido, with hyperexcitability, a markedly quieting effect. The thyroid and pituitary, both of which are supposed to control and stimulate skeletal and bodily growth generally, have an excitatory effect upon the development of the genital organs. For when by some chance either is found deficient before puberty has arrived, a delayed development of the generative organs is observed—uterus infantile, ovaries small and nonfunctionating, breasts undeveloped, and pubic hair absent. Such conditions may be combated, and often successfully by the administration of thyroid and pituitary glands, alone or in combination. Thus Ott and Scott have shown that the posterior lobe of the pituitary stimulates the activity of the breasts, and may, therefore, be used as a galactagogue. I have had a case in which the administration of

thyroid brought about the descent of testicles that had remained in the canal to the sixth year. The effect likewise of posterior pituitary extract upon the smooth muscle fibers generally and upon those of the uterus especially, needs but to be mentioned. Thyroid extract also stimulates a sluggish pelvic condition bringing about regularity in abnormal periodicity of the menses. Indeed many extravagant claims have been advanced even of its marvelous effect upon certain types of sterility. These types are usually seen in combination with hypothyroid—not to say myxedematous—conditions. The patients are sluggish, bodily and mentally, easily fatigued, with thick infiltrated skin, coarse hair and marked adiposity.

Generally it might be said that while the pituitary gland regulates the quantitative characteristics of the gonads or sex glands both anatomically and physiologically, the thyroid presides over their regularity and periodicity of function.

The adrenal gland, also one of the components of these endocrine glands, has a twofold activity depending upon whether the medulla or the cortex of the gland is considered. The substance epinephrin or adrenalin is made from the medulla, while the cortex secretes a substance antagonistic to this. This adrenal cortex is embryologically similar to ovarian tissue and at an early period of fetal life the two are connected. The medullary adrenal substance is chromaffin in character and has a marked blood-pressure raising principle in it, while the adrenal cortex like the ovary secretes a hormone opposed to adrenalin. As a result, when the ovaries cease to secrete at the menopause, the adrenal cortex does likewise, and we begin to notice a rise in blood pressure in the patient due to the unopposed medulla of the gland. Nothing else has so well succeeded in reducing this pressure as has ovarian secretion. The proportion of cortex to medulla in the suprarenals, is in man as 9:1. Tumors of the cortex in early life have produced precocious sexual development and even reversion of type in sex characteristics.

The involvement of the adrenals and thyroid during great activity of the ovarian and corpus luteum secretions is seen in the increased pigmentation of the skin, in the gradual subcutaneous infiltration of the skin myxedematous in character, and in the great drowsiness and sluggishness of many of the patients during the period of pregnancy.

Compensating for these conditions, the thyroid is frequently pushed beyond ordinary limits, and a goiter becomes evident. In a modified degree, menstruation occasionally shows a similar clinical picture, even to the temporarily enlarged thyroid. One of the

possible causes of eclampsia is the insufficient oxidation and elimination of toxins due perhaps to the inability of the thyroid to measure up to the increased demands upon it. Thyroid extract stimulates oxidation and hastens elimination and thus would seem to be indicated as a therapeutic measure in eclampsia. As a matter of fact, I have seen several cases of impending eclampsia improve under thyroid and go to term.

Another accident of pregnancy—abortion—has been supposed occasionally to be due to an insufficient internal secretion from the corpus luteum. If such abortion becomes habitual and if the patient presents other signs—as she frequently will—of deficient thyroid secretion, then will the administration of thyroid extract be of distinct benefit in lessening this tendency to abort. Curiously enough, corpus luteum itself will rarely be of service if given for abortion of this kind.

During the puerperium, the reduction of the uterus to its normal state is dependent partly upon the normal activity of the pituitary and adrenals. If these are deficient, subinvolution with occasional hemorrhage results. The exhibition of pituitary extract from the posterior lobe of the pituitary in small doses intramuscularly administered, is practically a specific for this condition.

The neuroses and psychoses seen during and following pregnancy have many of them an origin dependent upon an internal glandular disturbance—the balance having been destroyed by the intense demands made upon the various members of the series, and the subsequent inability of the weaker ones to compensate. Here thyroid extract again is of great value in stimulating the other glands to activity and in assisting thereby to restore the equilibrium.

At the menopause we come to another critical period of woman's life. Her depression and irritability; the vasomotor disturbances seen in the flushing of the face, the paresthesiæ in the extremities; the high blood pressure; the putting on of weight; are all symptoms and signs of endocrinopathic significance. The involution of the ovary at this time leaves the adrenal cortex without its coadjutor, and hence the balance between cortex and medulla of the adrenals is disturbed in favor of the medulla. The medullary secretion contains the prime blood-raising principle of the body—adrenalin—which is then overeffective and an increased pressure with its various symptoms results. The thyroid, working parallel with the ovary, also diminishes in activity, and as a result we get increase in body weight and depression in spirits. In such circumstances, it is clear that ovarian insufficiency lies at the bottom of the disturbance and

its administration, together with small doses of thyroid, frequently, is all the medication necessary to effect an amelioration in all the symptoms—high blood pressure, irritability, vasomotor difficulties, and abnormal weight. The early appearance of senility in some of these cases can also be combatted by glandular therapy, especially thyroid in combination with ovarian extract.

Having now rapidly summarized the orthodox views of the present day of the interdependence of the functions of the endocrine glands and the female generative organs, let me criticise some of these statements. In the first place, we have taken practically no account of the activity of the vegetative nervous system in this interacting seance; nor do the text-books in gynecology and obstetrics seem to consider its importance. And yet, the adrenal secretion effects primarily the sympathetic neuromuscular synapse in smooth muscle. Adrenalin is poured into the circulation as a result of various emotions, of fright or pain or forced movement and only then if the splanchnic nerves are intact, and through their stimulation. Its effects when so circulating are upon neural tissue, stimulating the sympathetic end-organs.

Thyroid secretion stimulates the vegetative nerves, causing various sympathetic phenomena, such as cardiac acceleration, respiratory increase, myosis, and through the hypogastric plexus of the sympathetic, stimulation of the sexual organs. It acts upon the sympathetic nerves ends in smooth muscle tissue as a sensitizer for adrenalin, enhancing the effect of the latter. Without the co-operation of the sympathetic plexuses of the generative organs, secondarily involving adrenals and thyroid, the sexual organs cannot be completed. In short, it is by means of the vegetative nervous system that the secretions of the endocrine glands are mutually accelerated or retarded in proportion as they are demanded by the needs of the organism.

In the second place, we have given the clinical pictures of cases in which one or two glands are at fault, and such pictures are fairly clear and distinctive. And yet there is no syndrome involving a dystrophic activity of one or even of two of the endocrine glands. Every disturbance in the internal glandular mechanism involves of necessity every single one of these structures—all cases are pluriglandular ones. Here and there the symptoms due to a single gland stand out sharply in the picture, but this gland far from being the real cause of the difficulty, is frequently the last one involved and the one to be disregarded in the therapy. Thus I have under my care a patient who gives all the evident signs of a disturbed

pituitary activity—drowsiness, headache, high blood pressure and bitemporal contraction of the visual fields. Her symptoms came on soon after the establishment of menstruation and naturally the thought arose that the interrelation between ovary and pituitary was at fault and that therapy directed toward this condition would prove effective. When the treatment, however, failed, closer examination gave the suggestion that the original disturbance lay in the thyroid. The thyroid secretion was found deficient, and hence ovarian development was tardy, causing pituitary disturbance secondarily in the attempt to compensate for the thyroid deficiency. When this view of the matter was accepted and the patient placed on thyroid, an immediate change for the better was noticed in all her symptoms. To-day she is almost well, in all particulars, even to the rehabilitation of the visual fields.

The consideration of such cases as this leads me to advise for the determination of the status of every patient that shows disturbance of the function of the generative organs, together with suspicious symptoms of endocrine disharmony, a most thorough examination of the internal glands. Never be satisfied with the apparently simple answer that may superficially appear, but always insist on tracing back to first beginnings even the most minute complaints referable to endocrine disturbance. You will usually find structural anomalies to bear out your suspicions of such disturbance—the size and spacing of the teeth, the malformations of the face and skull, the character of the hair and possible reversion to the other sex in its distribution, the size of the extremities in relation to the trunk, the pigmentation of the skin, the adiposities, the vasomotor skin reactions, the blood pressure and the mental reactions of the patient—are but a few of the characteristics to be weighed. The patient is then to be treated—irrespective it may seem to be of her actual gynecological complaints—on the basis of the original internal gland at fault, and if that has been correctly determined, a brilliant result will reward you. And for the same complaint in two successive patients, you will frequently find, on this basis, widely different remedies. This accounts for the discrepancies in many of the text-books which endeavor to give in table form, glandular extracts for specific gynecological troubles—much as the compendiums of medicine give favorite prescriptions in pneumonia, typhoid and whooping-cough. And this also accounts for the innumerable failures in internal glandular therapy. Thus thyroid extract will in certain patients increase the menstrual flow, and in others decrease it; it will in one patient retard its periodicity and in another acceler-

ate it. An that is the reason also, why pituitrin will not always produce the contractions of the uterus that you so confidently expect postpartum. In hyperpituitaric patients you may get an increase of blood pressure by its use with a possible increase of the hemorrhage and the contractions remain feeble. And there is still another element of variability in internal glandular therapy—the seasonal factor. Thyroid gland in spring gives different results than in autumn and winter. We need only mention the fact that in hibernating animals, the pituitary gland diminishes its activity markedly at the onset of winter, producing the inactivity, the sluggishness, and the diminished oxidation at this season, characteristic of these animals. And who of us will deny the extremely enhanced sexual irritability in springtime?

So that among all these variables, it is impossible with our present knowledge to classify these cases into groups. Each case is a separate study in itself, and only when so considered can the relation between its genital disturbances and the activity of its endocrine glands be integrated.

155 WEST SEVENTY-SECOND STREET.

SYPHILIS OF THE UTERUS.*

BY

D. W. PRENTISS, M. D.,

Washington, D. C.

SYPHILIS, at present, is claiming a large part of our attention in differential diagnosis, and can be excluded only by repeated negative finding of several methods of examination of the blood, the skin and the cerebrospinal fluid. In recent years as our knowledge of the disease has advanced one symptom-complex after another has been taken from our nosology and placed with the conditions already known to be the result of infection with the specific spirochetæ. Instances of this are paresis and tabes dorsalis. No doubt many diseased conditions that to-day are not understood, to-morrow will be explained by infection with this organism. Because the disease is found in all the tissues of the body, and because its lesions are often accompanied by symptom reactions that are identical with the reactions from other causes, such as tuberculosis, benign and malignant tumors, and chronic intoxications from various substances both

* Read before the Washington Obstetrical and Gynecological Society, March 10, 1916.

organic and inorganic, almost no diagnosis is complete until the reports of the examinations for syphilis have been considered.

The pelvic organs of generation are often affected by syphilis. This subject has not been brought before our society since my connection with it, and it is on this account that I venture to give you a synopsis of one phase of it—syphilis of the uterus.

In studying a disease with reference to the causes we look first for the predisposing factors that have undermined the resistance of the tissues singly or collectively, and having considered these and determined their influence on the individual prior to the present illness, we then turn our attention to the search for the immediate or exciting cause. Syphilis is one of the great predisposing causes and is often overlooked. In the cases of syphilis the exciting cause is well known, but the demonstration of the *spirochetæ pallida* in tissues and in discharges is not always successful even when sought for by one who is well trained in laboratory methods. This probably accounts for the comparative lack of interest in syphilis of the uterus. That is apparent when one looks into the literature on the subject.

The subject of syphilis of the uterus has not been a very popular one with medical writers, so much so, that the index catalog, 2d Series of the Surgeon General's Library, including titles to 1914, gives less than fifty articles, none appearing in English. Most of the articles were published before the cases reported could have been proved by demonstration of the *spirochetæ* to be syphilitic in origin. Very little appears on the subject in our text-books on pathology, on gynecology or on obstetrics. To illustrate we will quote from a few of them(1).

Keys(1) says: "Lesions of the internal genital organs of the female come in the class of rare and obscure visceral lesions, sclerotic and gummatous, of which there are a few autopsy findings and a number of alleged cures by mixed treatment (*e.g.*, of metrorrhagia)."

McFarland(2) says: "Syphilis of the uterus is not common. The primary lesion or chancre is sometimes situated upon the vaginal portion of the cervix, such chancres being more frequent upon the anterior than upon the posterior lip. The ulceration is sharply circumscribed and has infiltrated borders and a brawny base. The lesion heals with the formation of a dense stellate scar. Erosions of the uterus developing upon irritating discharges are very frequent. Gummata sometimes form in the uterine wall, and diffuse chronic endometritis is common. Birch-Hirschfeld suggests that this syphilitic endometritis is a probable cause of the syphilitic disease of the placenta."

Palmer Findley(3) writing on uterine hemorrhage says: "Dalché emphasizes the importance of syphilis as a factor in uterine

hemorrhage. Syphilis of the uterus is seldom considered, yet the author finds it not infrequently in the form of a diffuse syphiloma, as a gumma of the cervix, or as a sclerotic condition of the uterus and its blood-vessels.

"Jaworski describes a syphilitic angiosclerosis of the uterus involving the whole organ and even the parametric tissue. In some instances the blood-vessels alone were involved in tertiary syphilis. Jaworski says that the hardening of the uterine blood-vessels and the loss of elasticity of the uterine tissues may give rise to frequent and copious hemorrhages. Five cases are recorded by the author. Antisyphilitic treatment controlled the bleeding and in some instances the uterus became smaller and normal in consistency.

"There are no characteristic symptoms of syphilis of the uterus. The most prominent symptom is hemorrhage which resists all the usual forms of treatment, including curettage, but reacts favorably to antisyphilitic treatment."

Specimens of macroscopic syphilitic lesions of the uterus must be rare. Dr. D. S. Lamb, curator of the Army Medical Museum can find but one specimen in that collection. Several local pathologists of considerable experience have never seen such a specimen.

The organisms of syphilis gain access to the blood current and are carried in it to all the tissues and organs of the body. The uterus, Fallopian tubes and ovaries are visited by the parasites, and specific lesions have been recognized in all of them. It is to the changes in the uterus produced by the *spirochetæ pallida* that I call your attention to-night.

Primary Lesions.—The primary lesion on the vaginal portion of the cervix is not common, nor is it so rare as to be a medical curiosity. The structure and appearance do not differ from lesions on other mucous membranes.

Chancre of the endometrium of the cervix and body must be extremely rare. No reference to such a case was found in the literature.

Secondary Lesions.—Secondary lesions of the vaginal portion of the cervix are seldom mentioned but undoubtedly occur, and should be similar in their pathology to the mucous patches in other situations. Probably many erosions of the outlet of the cervical canal are of this nature.

Since the secondary stage of the disease means that the *spirochetæ* have entered the blood stream and have been conveyed to the various tissues and organs of the body, lodging especially in the skin and mucous membrane in sufficient numbers to produce the lesions, would it not be strange indeed if the mucosa of the uterus escaped infection? The uterine mucosa does not escape. Some authorities

(Adami and Nicholls, 1910) say that secondary lesions are found. McFarland says: "chronic diffuse endometritis is found in the uterine mucosa." One stage of the menstrual process is extremely difficult to differentiate from a syphilitic cellular infiltration. With careful search for the spirochetæ the processes will in the future be separated. Syphilis of the fetus and placenta is dependent upon syphilitic endometritis.

Syphilis of the Placenta.—Much work has been done along this line already. The pathologic changes in the placenta, according to Williams, are great swelling (edema) of the chorionic villi, round-celled infiltration and a great reduction in the number of blood-vessels. These changes vary in different portions of the placenta and according to the extent in which they are present the fetus will be undersized from poor nutrition or will die before birth. Several members of our society are making detailed studies along this line, and I hope they will discuss at length this phase of the subject.

The umbilical cord may show cellular infiltration about the vessels, changes in the adventitia, edema of the muscular coat and thickening of the intima (Williams).

Tertiary Lesions.—Tertiary lesions of the uterus have been described and differ in no way from similar lesions elsewhere. Gumma in the uterine wall is not common. Perhaps the commonest changes met with are perivascular round-celled infiltration, arteritis and end-arteritis and a true syphilitic fibrosis. Uterine hemorrhage as a result of the vascular changes has been described and proved by the therapeutic test after all other methods including curettage have failed.

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TRANSACTIONS OF THE NEW YORK OSTETRICAL SOCIETY.

Meeting of May 21, 1916.

The President, DOUGAL BISSELL, M. D., in the Chair.

DR. CHARLES G. CHILD, JR., reported a case of

REGURGITANT MENSTRUATION THROUGH THE FALLOPIAN TUBES.

"In 1908 I reported a case of pyosalpinx with spontaneous rupture through the abdominal wall. The rupture had occurred some seven months before the patient came under my care and the opening had never closed. From the sinus each month, coincident with menstruation, there was a profuse sanguinous discharge. At operation the right tube, considerably thickened, was found adherent to the abdominal wall at the internal inguinal ring, and the uterine sound when introduced into the sinus easily passed the length of the tube into the uterine cavity. This was the first case of the kind that had ever come to my attention. Last summer I met with a second one even more remarkable.

"Mrs. G., aged twenty-nine, always well, menstruation normal. She had married three months before I saw her and to prevent conception an antepregnancy button as she described it, was inserted in the cervix by a practitioner in a neighboring town. He instructed her to return each month just before menstruation and have the button removed, but this she neglected to do. For the three periods that the button was worn the menstruation was scanty and accompanied with severe pain such as the patient had never had before. This pain became progressively worse and finally continuous. The button was then removed, but without relief. About this time she consulted me and examination showed a uterus normal in size and position and with no marked restriction in mobility. She had an extremely tender pelvis, but it seemed possible to make out an enlargement of the right adnexa with marked fullness in the culdesac. A diagnosis of possible ectopic was made and an exploratory culdesac incision advised. I might state here that it was only at a postoperative confession that I learned of the antepregnancy button.

"Operation, July 19, 1916. Dilatation and exploration of the uterine cavity was negative. Posterior colpotomy revealed free blood in the peritoneal cavity. Transverse suprapubic abdominal

incision, uterus normal in size and position, no adhesions. The pelvic cavity contains a large collection of thick, dark blood of a sticky consistency with a few soft clots. Both tubes were normal though they seemed to be slightly enlarged; their distal ends when drawn up out of the exudate were not adherent, the fimbriæ perfectly free. From the lumen of both tubes the same dark, sticky blood was squeezed. Ovaries normal. The pelvic exudate in this case was the same in general appearance as one meets with in cases of retained menstruation due to atresia of the vagina. It showed no tendency to adhere to the peritoneum or viscera, but came away clear with the sponging. Convalescence was uneventful, there was a relief of all pain and the patient has menstruated normally since."

DR. H. J. BOLDT, in opening the discussion, said: "With regard to the last case, I would say that the so-called intrauterine spring stem pessary was first brought into use in Norway very many years ago. There are some used in this city by general practitioners, particularly of a certain class who make it a specialty to introduce this intrauterine spring stem pessary for that purpose. So far as the patients I have seen with this intrauterine stem are concerned, I would say there has never been any difficulty as to the escape of blood from the uterine cavity at the menstrual period; they would go along without any trouble at all, but the danger of an instrument of that kind is that being introduced very frequently by men who have no gynecological experience, sometimes they use it in instances where patients have some form of tubal lesion and in that class of patients there is an additional risk taken in that they may get a localized peritonitis, and I have seen several such instances. In Germany several articles have been published on that particular method for treatment of the prevention of conception and they have noted similar occurrences. Moreover, it is not an absolute guarantee against conception. Some of those patients who have worn stems abroad have been reported to have conceived with very undesirable results; they usually abort at the second or third month."

DR. HERMAN GRAD.—"This case of Dr. Child's is very interesting and his explanation of the presence of the blood in the peritoneal cavity may be the proper one, but I think that attention should be called to the fact that the uterine opening of the tube is exceedingly small, and not only that, but if you try to force fluid into the tube by way of the uterus you will encounter considerable difficulty in doing so. It is necessary to use quite a little force and the injected fluid will only come through the tube drop by drop.

"I had an interesting case which perhaps may bear on the subject under discussion. A few years ago a young woman, a virgin, began to have metrorrhagia and I curetted her. I was not able to find anything pathological in the pelvis. After the curettage the flow continued. The flow was so persistent that I opened the abdomen. Both tubes seemed to be normal except that one had a little different appearance as compared with the other. I removed this tube and sent it to the laboratory. A small area of an ectopic was found in

this tube, so small that one might overlook it with the naked eye. It had to be subjected to the microscope to really differentiate it, and it was this condition that gave rise to the bleeding. The peritoneal cavity contained blood. It is possible to have a very small ectopic, a very minute lesion which gives rise to bleeding, and perhaps that might be the case here."

DR. J. MILTON MABBOTT.—"I assume that Dr. Child's explanation of his case is correct but I was always under the impression that the chief reason why menstrual blood does not coagulate is because it becomes mixed with vaginal mucus. In Dr. Child's case there is no reason to assume that any vaginal mucus was mixed with the uterine blood which regurgitated through the Fallopian tubes. In tubercular peritonitis we have an admixture of serous exudate with blood which often does not coagulate and sometimes a small celiotomy is curative of tubercular peritonitis. Assuming that the woman, who I think Dr. Child said had some tenderness of her abdomen on examination, had had a tubercular peritonitis, even though slight, she would have been in poorer health, her menstruation would have been very scanty, and if the laparotomy resulted in a cure of the tubercular peritonitis, her general health would improve and the amount of menstrual fluid would naturally return to normal. I simply present this as another possible theoretical explanation."

DR. CHILD, in closing the discussion, said: "In regard to Dr. Grad's suggestion of an ectopic, I would say that there seemed to be nothing suggestive of it in this case. Both of the tubes were carefully inspected. The blood flowed freely into the uterine cavity and it was possible to introduce a large filiform bougie, leaving an opening there which would admit of a great deal more than a drop of blood. The normal tube is so small that it only takes a very fine filiform bougie. The canal seemed to be very much larger than normal. The blood which one gets in an ectopic is very characteristic of the blood of an internal hemorrhage anywhere else. There is usually a normal coagulating period and we always find clots. No matter how young the ectopic or how small we always find clots after rupture, but that was not the case in this instance.

"It was not the "abdomen" which we meet with in tubercular peritonitis. Her menstruation had always been regular up to the time of the attack. It then became painful and pain carried over the menstrual periods.

"Although my explanation may be incorrect, still I can only say from the evidence in this case as it came before me, that the explanation given, it seems to me, is the most plausible one.

"Dr. Vineberg asked me if the uterus was distended. There was no reason why it should be distended because the button had been removed some time before I saw her. If it had been previously distended it had contracted back to its normal size."

DR. HIRAM N. VINEBERG, reported a case of

PREGNANCY FOLLOWING SALPINGO-OOPHORECTOMY FOR SALPINGITIS
AND HEMATOMA OF OVARY, FREEING OF ADHESIONS
OF RIGHT ADNEXA AND OPENING CLOSED TUBE.
APPECTECTOMY FOR GANGRENOUS
APPENDICITIS.

"I assume most of us do such work as I did, in the case about to be reported, in the hope that conception will be made feasible and, I think I am safe in assuming that such efforts are seldom attended with the desired result. Hence, my object in presenting this case for the purpose of putting it on record and eliciting in discussion how often others have met with success with the procedure.

"Mrs. J. W., aged twenty-six years, married twelve months, never pregnant, was seen by me in consultation June 15, 1915. The patient had been taken ill with pain in the left groin May 26, and had slight fever for the next three to four days. After a few days pain was felt in the right lower quadrant of the abdomen and a couple of days later the pain shifted again to the left side. I found the patient, a thin woman, in bed, with a universally rigid abdomen. The uterus lay in partial retroversion, the posterior vaginal vault was rigid and the left fornix offered considerable resistance, but no definite mass could be felt. The diagnosis was made of perimetritis and palliative treatment advised. The patient was seen by me again ten days later. In the meantime her symptoms had not abated and the temperature ranged about 100° , once reaching 102° . At times the pain in the right side of the abdomen was very severe. A bimanual examination was unsatisfactory, owing to the great rigidity of the abdomen. There was decided tenderness over the appendical region. A laparotomy was now advised, as it was deemed very probable that a subacute appendicitis was the chief pathological lesion. On June 17, the patient was operated upon by me at Mt. Sinai Hospital. The uterus lay retrodisplaced and was adherent posteriorly, as were both adnexa. On freeing the adhesions of the left adnexa, the tube was found considerably inflamed and the ovary, the size of a tangerine orange, was cystic throughout. Both tube and ovary were removed. The ovary consisted of a thin membranous sac filled with serosanguinous fluid. On enucleating the right adnexa from its adhesions, the ovary looked fairly normal and was left intact, the tube, at its fimbriated end, was club shaped and closed, on pressing the end of the tube with the fingers, the occluding membrane was ruptured and the fimbriae were liberated and the lumen of the tube exposed. Nothing further was done to the tube. On searching for the appendix a mass, the size of a small hen's egg, was found high up, just beneath the liver. The abdominal incision had to be extended considerably upwards to render it accessible. The mass was found to be made up of adherent cecum and ileum and containing, in its center, the appendix, which, on removal, showed the mucosa to be in a gangrenous con-

dition. The abdomen was closed in the usual manner, with tier sutures. The patient made an uneventful recovery. In the course of a couple of months, the patient expressed herself as being perfectly well.

"March 24, 1916, the patient visited my office and stated she had not menstruated since January 10. She had stained slightly on February 18, and for a couple of days afterward. I found the uterus corresponding in size to the period of gravity, between the ninth and tenth week. There was a slight erosion of the cervix, otherwise conditions were normal."

DISCUSSION.

DR. J. N. WEST.—"About sixteen or eighteen years ago the conservation of diseased tubes which were not filled with pus and which were closed, was introduced into this country, I think, by Polk. It was followed up very extensively by several other operators, one of the chief of whom was Dr. A. P. Dudley. The operative procedure consisted in dissecting the tube from the ovary and uniting the peritoneal with the lining membrane of the tube and thereby attempting to restore the lumen of the tube. Sometimes the tube was wiped out with an antiseptic. I became interested in this work and did a considerable number of cases in that way and wrote a paper on the subject about 1908, and at that time, Kahn, of Paris, had published a very extensive monograph in which he had gathered from all the literature of the time a number of pregnancies which had occurred after resection of both tubes, and he reported in this paper thirteen cases of pregnancy. In my own experience I had three cases of pregnancy following resection of both tubes where both tubes were completely closed at the time of operation. I was trying to determine if it was a proper thing to do or not, whether to remove the tube close to the uterus and try to conserve it with the idea of having future pregnancies. One of my cases has borne three children. The first child died. Two other cases each bore one child, making a total of four living children. Two women died eventually of intestinal adhesions around the tube, and one almost died. I was called in to see this patient when she was in an advanced stage of peritonitis and intestinal obstruction from adhesions about the tube. Her life was saved by operation, but two died. One died under my care. So that two of the women died and four children survived as a result of this attempt at plastic work on both tubes in a considerable number of cases. A good many of these patients had symptoms remaining afterwards, perhaps as a result of adhesions and infections of the parts of the tubes which were left behind, and were not cured of the symptoms for which they were operated upon. I, therefore, concluded that it did not pay in a perfectly healthy woman who simply had closed tubes and was sterile on account of closed tubes, to undertake to resect the tubes when she was not suffering from other symptoms, because we are apt to have a mortality in the women almost equal to the birth-rate among those that did reproduce. A great many did not repro-

duce and did not become pregnant at all. The mortality rate was entirely a late secondary one. None of the women died from the operation. All recovered, but the intestinal adhesions occurred from about eight to eighteen months after operation."

DR. F. R. OASTLER.—"At the time when conservative work was at its height and we were all resecting tubes I started in and operated on some two hundred cases and have since done more or less of the work, but generally less. My experience with the cases operated on can be summed up as follows: The results as regards later pregnancies have been very unsatisfactory. The results as regards future symptomatology have been more or less unsatisfactory, so I have come to the conclusion that the only indications for doing this conservative work upon the tube are those conditions where the woman is particularly anxious to have a child. Probably it is otherwise better to remove the tube as a whole. One particular reason against doing conservative work is that it seems to me it is so difficult after doing a conservative operation on the tube to be sure of the patency. I find that before and after doing conservative work a great many tubes are apparently closed at the uterine end, precluding the possibility of pregnancy. On the other hand it is just possible you may get a very satisfactory result. Only about ten days ago I delivered a woman of her fourth child following conservative work upon both tubes. It was an emergency case where the woman had had a postpartum sepsis and had gone for five or six weeks. I was called in consultation and found two large abscesses on either side of the abdomen. The woman was in very poor condition at the time. I opened the abscesses and found the tube ends both closed on either side and also very much distended with pus, so I simply made a longitudinal incision in each tube, put in rubber tubing for drainage through the tubes and brought the rubber tubing out through the abdomen with a little packing around it. She made a very good recovery. I had another case some time ago with two very large ovarian cysts. In that instance I removed the cysts and the tube ends were closed. I removed one tube and left a portion of the other and took a portion of the ovary from one of the cysts which seemed to be healthy and sewed it close to the tube. The patient became pregnant subsequently and had a child. That also is one of the miracles of gynecology which we see once in a while. I think a small proportion of cases became pregnant following this work. Generally speaking, however, I think it is not to be encouraged as the secondary symptoms following operation are unsatisfactory and the great difficulty seems to be in getting a clear passage from the tube end into the uterus."

DR. G. G. WARD, JR., said: "I have been very much interested in what Dr. Oastler has told us about the case in which he delivered a woman of her fourth child. I think I understood him correctly when he said he passed rubber tubing into the tubes after resecting them."

DR. OASTLER.—"I did not resect them. The tube ends were closed. I opened up and let the pus out and drained with rubber tubing."

DR. WARD.—“That is, you put rubber tubing into the tubes to drain?”

DR. OASTLER.—“Yes.”

DR. WARD.—“That is interesting to me because it brings up in my mind the question as to whether or not that expedient had anything to do with keeping the tubes open and patent so that she could become impregnated. I think the cause of failure in these operations on the tube where plastic work is done in the hope of bringing about pregnancy, is that the tubes are occluded in the healing process so that we do not obtain a patent tube. Now it may be that what Dr. Oastler did (passing drainage tubes into the tubes and maintaining them there for several days, or as long as necessary) may serve as a reason why those tubes remained open. I wish to say that I have adopted the expedient for several years, where I have done the operation of making an artificial opening in the tubes, of passing strands of catgut into the lumen of the tube and fastening them there in the hope that they would maintain the patency of the tube. Dr. Oastler's report of the fact that he evidently was able to maintain the patency of the tubes by inserting rubber drainage tubes into the tubes is of considerable interest.”

DR. C. G. CHILD, JR.—“I believe myself in conservative work on the tubes where there seems to be the slightest indication for it and I should be very sorry indeed if this meeting were to go down on record as being against such conservative treatment of the tubes. I have cases where conception has followed, not only a single pregnancy to term, but even two and three pregnancies after conservative work on what appeared to be almost hopeless tubes at the time of operation, and whereas it is very difficult to get at the actual percentage in these cases still there is a sufficient number to substantiate my belief in the value of conservative work. I do not believe in the ruthless removal of tubes simply because they happen to be clubbed and closed off by gonorrheal infection of maybe many years ago. The attempt to establish the patency of the tube by the introduction of strands of catgut, as Dr. Ward has reported, I have done myself in cases where a resection in the middle third of the tube was done. I there inserted kangaroo tendon in the hope that it would serve to keep the tube patent long enough for the resection to be efficacious. I have never had any cases that conceived, so far as I know, after that operation, but two years ago one case was reported in the literature where pregnancy had occurred in which both tubes were treated in that manner. Dr. Oastler has said that he does not favor the resection of the end of the tube because of the difficulty in passing a filiform bougie through the cornual opening into the uterine cavity after such a resection because he believes that the tube is very often closed at the cornual end. The work which the pathologists have done on these tubes shows that the cornual end of the tube is very seldom, if ever, closed. It is the distal end which is closed, and those examined, and examined very carefully, haven't shown any obstruction at the proximal end. Therefore, I must repeat again that I should be sorry if we are to go on record

tonight as being against the conservative treatment of diseased tubes."

DR. H. N. VINEBERG.—"The report of the case has achieved its purpose in bringing out a discussion. I do not quite understand Dr. West's attitude as to the dangers of doing conservative work on the tubes. I do not know the method which he has employed, but I know the method which I have employed and that is simply amputating the outer portion of the tube or the part that was diseased, and then passing a couple of fine catgut sutures between the peritoneal covering of the tube and the mucosa. I cannot comprehend how that would bring about any bad results. Of course you may have adhesions and you may also have adhesions from a simple amputation, but that any ill effects should follow I cannot see. It is singular that ordinarily if we desire to sterilize the woman a simple amputation of the tube or a ligation and amputation is not sufficient, but the tube must be buried underneath the peritoneum, as otherwise, it will become patent again and the woman can conceive. There are a good many cases on record where purposely the tube was tied so as to sterilize the woman and conception followed. I think the reason for the usual poor results is that the operation is done upon a tube in which the mucosa is diseased. In this case, however, I am rather inclined to think that the tube was healthy and that the local peritonitis was caused by the appendicitis and that I had here a favorable condition for successful work, simply by not doing anything at all except bursting the membrane which closed the tube and evidently having removed the original cause of the inflammatory condition (that is, the appendix), the tube remained patent."

DR. JOHN H. TELFAIR presented a specimen showing

SPONTANEOUS RUPTURE OF THE UTERUS.

"This specimen is the uterus of a patient admitted to Fordham Hospital at 10.30 P. M., February 28. Upon admission, this patient was in a condition of profound shock, presenting evidence of internal hemorrhage, having no pains and showing a moderate amount of bleeding from the vagina. Rupture of the uterus was recognized and I prepared to deliver her at once. Under anesthesia, I found a breech presentation with one foot in the vagina, and commenced cautious traction, thinking of a possible rupture of the lower uterine segment, still extraperitoneal, and one which could be better dealt with after extraction of the child *per vaginam*, providing the extraction could be accomplished without further traumatism. It soon became evident that sufficient force to deliver the child would further endanger the integrity of the uterus so I stopped all further efforts of traction and opened the abdomen. The laceration of the uterus consisted of a transverse rupture of the vaginal vault anteriorly, extending to the left, opening up the broad ligament and extending upward to the junction of the upper and lower uterine segments. Five or six centimeters of the vertical portion of the

tear communicated with the peritoneal cavity. A craniotomy and extraction was done, followed by an immediate hysterectomy. The patient died on the table."

DISCUSSION.

DR. G. G. WARD, JR.—"I would like to ask Dr. Telfair what is the reason he did not remove the uterus with the fetus instead of doing a craniotomy? Would it not have saved a great deal of time?"

DR. TELFAIR.—"I felt that if it were possible to keep on with the extraction of the baby it would have been better. One leg was extended down into the vagina. The foot was external. I thought that if there was an incomplete rupture of the uterus the best thing to do would be to do an extraction if it were easy. If this had been a vertex presentation I believe I would have done differently. The fact that so much of the baby had already come through the pelvis leads me to believe that a removal of the uterus under those conditions would have been extremely difficult."

DR. H. C. COE.—"These cases of spontaneous rupture of the uterus are very interesting. I recall one many years ago in Vienna, when I was studying with Carl Braun. The patient was sent in apparently *in extremis*. It was in the preaseptic days. In that case two large drainage tubes were introduced and strange to say, she recovered. I remember on making a visit to the New York Maternity Hospital I saw a patient who had been brought from the delivery room two hours before. No one had noticed anything particular about the case, but I observed that she was very pale and that the pulse was rapid and feeble. She had had a perfectly normal and rapid delivery. On making an examination I found that there was a rupture of the lower segment. A laparotomy was performed and she died soon after the operation. The tear was into the left broad ligament and had lacerated the uterine artery. There was not a drop of blood in the peritoneal cavity, but there was an enormous hematoma which extended as high as the kidneys on both sides. In other words the patient had bled to death outside of the peritoneal cavity. It was a most interesting case as there was no apparent explanation for it and the accident had not been recognized at all."

DR. H. N. VINEBERG.—"Didn't the tear begin in the cervix and extend upward?"

DR. H. C. COE, in answer to Dr. Vineberg's question said: "I wasn't there at the time of delivery. Apparently it did."

DR. H. N. VINEBERG.—"This case does not seem to have occurred spontaneously. It must have been a traumatic tear. I cannot conceive of a tear occurring in this way spontaneously. If the tear occurs in delivery it usually begins in the cervix and extends upward."

DR. JOHN H. TELFAIR.—"I think that Dr. Lobenstine's analysis of rupture of the uterus made a few years ago demonstrates quite conclusively that a spontaneous tear of the uterus can occur in this particular region, at the cervicocorporeal junction, usually as a

transverse tear about at the vaginal fold anteriorly. I am not prepared to say that this was a spontaneous rupture occurring without the possibility of manipulation but I feel quite convinced that this type of rupture may occur at any stage of labor. The ruptures of the body of the uterus, that is, the upper uterine segment, I believe are most apt to be traumatic and not spontaneous. I have not had the opportunity of seeing many specimens, but this is the first specimen where I felt that much manipulation had not been done on account of the general appearance of the case at the time that it came under our observation. There was not the usual evidence of meddlesome obstetrics and I believe the case to have been one of spontaneous rupture."

DR. WILLIAM P. POOL presented a

UTERUS CONTAINING SARCOMATOUS DEGENERATION OF A FIBROID
AND AN INDEPENDENT ADENOCARCINOMA.

H. S., aged fifty-seven, married thirty-five years, ten children, the youngest of whom is seventeen years. All pregnancies and labors were uncomplicated. The menstrual history was normal. The menopause occurred four years ago, and at that time she had a profuse menorrhagia which recurred at irregular intervals until menstruation ceased, a period of about six months. This, she was assured, was a natural and proper accompaniment of the change of life. During a few months following this she had neither discharge of any kind, nor discomfort, and believed herself to be in good health. Three years ago she began to notice a yellowish white discharge which persisted, and in which there appeared occasionally streaks of blood. The leucorrhea gradually increased in amount, and at times there was a considerable bleeding. During these past three years she has seldom been without pelvic discharge, and has also suffered constantly from pain in the back and pelvic tenesmus. Of late there has been much vesical irritation and partial incontinence of urine.

Examination revealed a relaxed vagina, and a cervix a little enlarged, having a small bilateral laceration, and bearing a moderate amount of cicatricial deposit. Otherwise the cervix seemed to be healthy. From the external os there poured a brownish watery malodorous discharge. The fundus was located at a point about midway between the symphysis and the umbilicus, and the corpus uteri was proportionately and symmetrically enlarged. The whole mass was fixed. A diagnosis of fibroid undergoing necrosis or other degeneration was made.

Abdominal hysterectomy was done Dec. 15, 1915. The uterine mass was about the size of a large grape fruit, and of perfectly symmetrical development. It was adherent to the small bowel at several points and densely adherent to the rectum posteriorly.

The perimetrial tissues were thickened and rigid, but no enlarged glands were discovered. These conditions offered some difficulty in the operation, and there was considerable hemorrhage. The patient

made a rather stormy convalescence, developing a large pelvic exudate which suppurated and finally discharged through the lower end of the abdominal wound. The induration gradually cleared away, and when last seen, she was in very fair condition, locally and generally.

The point of interest is in the pathological findings in this tumor. The mass was found to be a large submucous fibroid attached by a broad base to the right side of the uterine wall, and completely filling the distended cavity. This fibroid mass had undergone extensive degeneration, and was broken down and sloughing in a number of areas. In addition to this there was a well-defined area of disease on the wall of the uterus opposite the seat of the fibroid, that is, on the left side, which proved on microscopic examination to be adenocarcinoma. The sarcoma was confined to the fibroid mass, and the carcinoma was found only in the uterine wall. The cervix was unaffected.

From the position of the carcinoma it is assumed that it was caused by the prolonged irritation of the endometrium at the point where the fibroid mass pressed upon it.

DR. GORDON GIBSON read a paper on

THE RELATIONSHIP BETWEEN PELVIC DISEASE AND MANIAC DEPRESSIVE INSANITY.*

DISCUSSION.

DR. LEROY BROWN, in opening the discussion, said: "I think that the doctor's work is most important, especially so since he approaches the whole subject with the same mind and also the training not only of the surgeon, but of the alienist as well.

"My work at the Manhattan State Hospital, which he did me the honor to refer to, was based solely on one thing, namely, that an insane woman is as much entitled to be made as physically comfortable or to enjoy physical health as it is possible for her to do, as a woman who is not insane, and on that basis only was the work that I entered upon at the Manhattan State Hospital done. I know nothing about psychiatry, so, therefore, all that work was left entirely to the members of the resident staff.

"Now, as to the amount of work which we did at the State Hospital: there were 411 cases collected and tabulated and, as I say, were operated upon particularly for the relief of the pathological conditions in the hope that the patients might be made more comfortable, and while that was true of many of them, there were cases, as Dr. Gibson refers to, of pure dementias in which there was no hope of any mental improvement. It was simply a question of improving them physically and making them better units of the Colony, and while that was true, these cases were studied, not by myself, because I wasn't able to study them, but by the resident staff.

"Now with regard to the possible effects: of the 411 cases seventy-

* For original article see page 439.

two were discharged as either recovered or greatly improved, and of those seventy-two, thirty-four apparently had their recovery markedly hastened by the surgical operations that had been done. All this was done, not by myself, as I say, but by the house staff. Now, of the cases belonging to the maniac-depressive class, whose insanity depends upon their poor health, any improvement in their general health would tend to hasten their recovery. For that reason I felt, and do still feel, that these patients do usually recover, exactly as in the case of a patient suffering with digestive trouble you would effect a cure by freeing the patient of autointestinal intoxication through the intestinal tract. If at the same time the patient has any pathological lesion giving rise to trouble, I think it should be removed, and many of them are very striking, and, as Dr. Gibson states, we found among the cases that were discharged as improved, I think, 58 per cent. of the recoveries of the seventy-two were referable to the first six months of treatment and after the six months of improvement during and including the year, they dropped to thirty-three, then rapidly diminished, showing that any treatment, whether of psychiatric or purely psychiatric origin or surgical, to relieve the condition should be given at an early stage. There is no doubt but that some of the improvements were very marked. One case especially I have in mind was a case in which we could not expect or hope to bring about any condition of improvement mentally, a case of dementia precox, and, as Dr. Gibson states, such a thing is impossible, but this woman had a streptococcus infection of the pelvic organs. Cultures were taken and it was discharging through a sinus in the vagina. She would not eat anything and had to be tube fed. She took no notice of anybody or anything. She was very hysterical generally. She made a recovery and it was delightful to see how that woman began to take notice, how she began to eat, to call people by their names and to recognize people, which she hadn't done before for months or years. That was purely an implantation of a septic infection on her psychosis, but she had a right to have that improvement. In some cases in the maniac-depressive classes where they had been in the hospital for four or five months and had made no improvement under the regular, typical, classical treatment, improvement was effected through the repair of some plastic condition in the pelvis that they needed. I have three instances of that in my last reprint in which they particularly improved after the surgical operation was done. This reprint is easily accessible and I won't take up your time by going into that aspect. I don't for an instant think there is any direct bearing, but it is simply a question of improvement of the physical health and thereby indirectly helping the patient. I do think, though, that in some instances it was mental, by quieting the patients. In several instances we operated on patients who were extremely violent and I recall one case in particular of acute appendicitis where the patient was so violent that it required the efforts of three or four nurses to hold her in bed. After the operation she lost

all her violence and instead of requiring three or four nurses to keep her under control it didn't require any. I have never seen a particle of surgical work done by Dr. Rawls, who was formerly associated with me in the Manhattan State Hospital, or myself that in any way added to the acute condition of the patient, and I feel that Dr. Gibson's work, with his special training as an alienist where he can follow these cases and see the result of this permanent improvement through the repair of pelvic lesions, which will give these women longer intermissions between their attacks, is a good work."

DR. W. G. WYLIE said: "I have not been present at the meetings of the Society for some time, but I noticed this subject was to be brought up tonight and having for many years been interested in one form of trouble affecting the mind and having had a great many cases of that special kind which I have treated in conjunction with some of the best alienists in the city, I was very pleased to hear what has been said and I am very glad that the subject is being taken up by others than the operators and gynecologists so that there might be a separation of the cases that can be helped from those that cannot.

"Now, to take the depressive cases, those especially due to arrested development and subinvolution which is so apt to follow in those cases, especially in women in bad condition: I have made more or less of a study of that and although I haven't written anything on it, it has always been my intention to do so, but I believe that there isn't any doubt but that the generative organs, especially the uterus, in the educated class of people are a very different thing than in the lower class of people.

"Having been an interne at Bellevue Hospital, starting in with diseases of women, knowing that I was going to make a practice of that special subject, I was impressed by the little that I saw of mental trouble connected with diseases of women, and then there was very little operating being done, and the change which took place in my experience, having lived in the Women's Hospital building for eighteen months and seeing the different operations done, I became especially interested in the difference between the effect of uterine troubles among the educated class of people through degeneracy and inherited disorders as compared with that among the poorer classes."

Here the doctor referred to the work at the Manhattan State Hospital resulting in an increase in recognition in cases of mental disease and that were it not for this particular line of work many cases would have gone unrecognized. Continuing, he said: "I have long been satisfied that arrested development of the generative organs is the first form of degeneracy. This is shown in organs which are small as a result of lack of proper development. If there is no deficiency in the growth of the patient or prolonged weakness, especially in women between ten or eleven and eighteen years of age, its effect is entirely different. Many children reach puberty

and go through adolescence without dying or being killed by the disease or trouble that they have had.

"The generative organs are very much more frequently degenerated and this may be seen in the case of any old family here in New York. If you take three generations you will find that the second generation is very much inferior to the first, and the third is inferior to the second, so you can hardly find anything like a normal development in the third generation. The race is worn out by the intense city life and simply leading what might be called an abnormal life, especially so far as the physical development of the organs is concerned. I know in observing women with antelexions, arrested development, prolapses and all kinds of things that complicate disease, it is more the fixation than the displacement which causes it to affect the existing disease. I have lived long enough to know that a girl with arrested development before she is twenty is certain to have trouble at the menopause. It generally comes a little earlier. The atrophy and shrinkage taking place at that time undoubtedly affect some nerves (reference here made to dysmenorrhea) and it causes a lot of cases of so-called melancholia, and if I were asked as to what causes so-called insanity in many cases, I would say, as the alienists tell us, that it is a group of symptoms. That is true, it is a group of symptoms, but there isn't the slightest doubt but that this class of women almost always have subinvolution of the uterus, and especially in acute conditions a lot of them are liable to it. The first effect of it seems to be an affection of the digestion and if there are reflex disturbances they add, especially if they have been constipated from having been so many times under treatment for different troubles, they get an infection, they have trouble about the appendix, which adds to it, and if they have a child they haven't the strength to really go through a normal labor and are very much more liable to have subinvolution. If they have a miscarriage or an enlarged uterus or gynecological disease, or what we sometimes call fibroid degeneration from small fibroids being hidden which keep the uterus hidden, most of them have a degree of melancholia. This is the class of cases where trouble is found.

"I think we can prevent nearly all of those cases if every one would do what I have done for nearly forty years; that is put every woman's uterus in good health, every woman who is not in perfectly normal condition, in perfect condition so far as the development of the generative organs after labor is concerned—systematically reduce the uterus to its normal size after delivery. Never let the patient use a bed-pan, unless it is absolutely necessary. Always sit her up to empty out the contents of the bowel. Then they can be up on the eighth day, and as soon as the lochia is free from blood examine the woman, push up the uterus and begin the application of a simple borated tampon as we used to call it, but never use a plug of cotton. Have it firm enough and place it up against some boroglycerid. There is a certain kind of boroglycerid which is different from glycerite. It is antiseptic and prevents fermentation of anything like pure glycerin. Have the nurse use this twice a

day for the eight days, if there are no untoward symptoms, and it will bring on involution complete in almost any case within five weeks. By doing that I have hardly ever had a single case in my whole forty years that has come back with any symptoms or effects of subinvolution in hundreds of cases.

"In the type of women I am speaking of it is almost certain to produce more or less of what we call melancholia. At the menopause these cases are almost sure to have trouble and if a woman has any enlargement of the uterus and arrives at her menopause with the uterus anything like double its size, she almost always has more trouble.

"You must not operate on these cases until you have treated the uterus in every possible way. You must bring it back to its normal size and condition. When you get it back to its normal size you can put a sound in the uterus without pain or bleeding and the woman will not have her so-called melancholia.

"I have gone to both private and public sanitariums or asylums where these women have been incarcerated and have been pronounced absolutely insane. I don't say it is dementia, but they are so accustomed to thinking it is that they wouldn't turn them out. If you take those cases and reduce the uterus often they are cured. In women up to forty-five the same reflex disturbances are produced only of a different type. You can take out the uterus and you can cure them and some of the cases I have done were pronounced by the highest men to be insane. You must put the whole intestinal tract in good condition without the taking of drugs, and that can be easily done in any case. In that class of cases there is no doubt but that these depressive cases can almost always be cured and prevented and I have done it almost absolutely."

DR. GORDON GIBSON.—"Dr. Broun spoke of the object of the operations being for the improvement of the physical condition of the patient. That was the original idea and still is at Kings Park, that any woman with gynecological lesions deserved to be put in the best physical condition. There are cases on which we have operated where there was dementia, and the reason for operating was to improve their general condition in order that they might be more easily cared for. In maniac-depressive insanity it has been observed that the psychical improvement goes hand in hand with physical improvement."

"Dr. Wylie spoke of arrested development. Now, what we have found in the arrested developments, in the morons and in the constitutional inferiors, is that with the arrested development of the psychic system there is arrested development of the pelvic organs. We have not been able to do anything with this type of case. Time after time men have done operations on this type and have made the weirdest statements to the relatives of the patient. For instance, the proprietor of a certain private sanitarium takes off the clitoris in cases of masturbation in insanity, telling the people that he can cure the insanity by so doing. It has not stopped the masturbating and has not cured the psychosis. This is only one of many false

ideas in regard to the effect of operations on the insane. When we come to conditions in the better class of patients that Dr. Wylie speaks of, we are in an entirely different field. These patients are neurasthenics, they are not insane. As Hermann pointed out these people complain more of symptoms of trivial conditions than they do of the real serious lesions, and that the symptoms of trivial conditions are more pronounced in neurasthenics than in normal individuals. Their neurasthenic condition is calling attention to the condition in the pelvis. The depression often seen in cases of subinvolution bears no relationship to *involution melancholia*, which is a psychosis occurring at about the time of the menopause. We do not use the term *melancholia* to define the symptom depression any more, and in a great many psychoses we find varying types and degrees of depression."

"You have all had the same experience as I, where people come to you to ask whether an operation on the pelvic organs of a woman who is insane will help her. Now, you can say that if the patient has maniac-depressive insanity and possibly one of the other benign psychoses that you *may* be able to help her."

DR. WILLIAM J. MARONEY read a paper on

SARCOMATOUS CHANGES IN UTERINE FIBROIDS.*

DISCUSSION.

DR. S. H. GEIST.—"In reference to the incidence of sarcomatous changes in fibroids, I wish to emphasize that only large series of cases can be considered. Since my paper to which Dr. Maroney referred, in which I reported 250 fibroids, 4.8 per cent. of which were sarcomatous, I have had occasion to study 100 additional fibromyomata and in only two instances were there evidences of sarcoma. The two cases in my series that recurred did so after supravaginal hysterectomy. Neither case was suspected of malignancy at the time of operation and it was only afterward when the recurrence took place that further examination of the original tumor demonstrated its malignant nature. The probable reason why more of them do not recur is because of the fact that the sarcomatous portion is usually in small isolated areas, well encapsulated in the center of a firm fibrous tumor and therefore implantation or vascular metastases are not common. I have found that when these tumors recur they are of a most malignant type."

DR. H. N. VINEBERG.—"It might be of interest to relate an experience which I had in one of these cases as to the question whether to do a pan- or total or subtotal hysterectomy. I operated on a woman about fifty years of age with simply a large fibroid. There was no suspicion of malignancy. I did a complete hysterectomy. The tumor was examined microscopically in the laboratory afterward and pronounced benign. Within a period of six or nine months this woman's abdomen was filled with hard masses which

* For original article see page 445.

proved to be sarcomata. The tumor was gone over again and sarcomatous tissue was found in it. We had another case which Dr. Krug operated on in which he did a supravaginal hysterectomy. I am not certain whether that tumor was examined or not, but there was no reason to suspect malignancy from the appearance of the growth. That patient had a very rapid recurrence of sarcoma and, as Dr. Geist has said, when these cases recur they recur very rapidly and soon become fatal."

TRANSACTIONS OF THE JOINT MEETING OF THE WASHINGTON OBSTETRICAL SOCIETY AND THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of April 6, 1916.

The President, WILLIAM R. NICHOLSON, M. D., in the Chair.

The first paper by DR. J. BROWN MILLER, of Washington, discussed

THE CAUSES OF STERILITY.*

DISCUSSION.

DR. EDWARD P. DAVIS.—While Dr. Miller has concisely stated his personal observation in cases of sterility, it may not be without interest to review some general factors in the case.

There can be no question but that the age of a woman has great influence upon sterility. If it is desired that the race reproduce itself rapidly, economic and social conditions must be such as to encourage early marriage. Some cases of deficient development in young women who marry are cured by pregnancy, which results in the growth of the genital organs. When this happens, the results are better than those obtained by surgical procedures. Where, however, the woman is comparatively young and normally developed, and apparently sound, and remains sterile, it is necessary to study those physiological factors which favor ovulation, the making of blood, and the cycle of menstruation. It is difficult to obtain exact knowledge concerning physiological processes, but we cannot ignore them in the study of this problem.

In cases of obesity with evident lack of thyroid, we see improvement in the general health and conception follow the use of thyroid extract, with a largely nitrogenous diet, and moderate doses of strychnia. As these are the only methods employed in these cases, it seems fair to believe that they have something to do with the result. In other cases of this sort, where there is a retroversion of the uterus,

* See original article page 450.

a cureting with shortening of the round ligaments and the thyroid treatment is sometimes successful.

Dr. Miller has wisely said that infection of the genital tract frequently causes sterility, and he alludes to appendicitis as an illustration. In my observation this condition is rarely present without invasion of the adjacent tube or ovary, and in some cases, in common with the appendix, both tubes and ovaries are involved.

As regards the surgical relief of sterility by operation, it is doubtful whether the effort to reopen closed tubes, loosen adhesions, and thus restore the normal condition of the tubes, is often successful. Those operations give the best results which correct displacements and improve the condition of the endometrium. The removal of the appendix rarely fails to benefit the general health of women who have disease of the pelvic organs.

Dr. Miller's contribution is timely and valuable, and welcome as a concrete expression of wide experience collected, assimilated, and digested by sound, surgical judgment.

DR. E. E. MONTGOMERY.—I do not consider that any subject could be brought before the Obstetrical Society more valuable, or more timely than the subjects presented to-night. The interests of the race and of the State are all centered in the continuation of the birth and development of healthy children. Therefore, conditions causing sterility are of the utmost importance. Of course, we recognize that there is a class of cases due to congenital conditions in which sterility is present with little chance of correction. There is another class in which the condition is the result of inflammatory changes during the life of the individual. These changes may cause absolute sterility from the beginning of marriage, or may be the cause of the one child sterility which is not so infrequent. Then again sterility occurs in individuals in whom conditions of this kind have not occurred, but in whom it is undoubtedly due to the existence of defective internal secretion of the ductless glands, rendering the patient unfavorable for conception. There are also cases which may be called relatively sterile, in which the individuals may be married, the woman not giving birth to children, and subsequently under changed relations, following other marriages children may be born to each of the parties. These cases are possibly those in which there is a condition of homology, and their secretions are poisonous to each other, rendering procreation impossible. This condition could be determined by examining within half an hour after coitus the secretion within the vagina. Certainly before subjecting any woman to operative interference, it is important that the secretion of the male be examined to determine whether the spermatozoa are active. To subject a woman to operation of more or less danger and discomfort before we are certain that she is at fault, seems to me unscientific, to say the least, is unjust, and places the responsibility where it does not belong. Therefore, before attempting operation we should make sure that both individuals are capable of procreation. Some investigations have shown that the administration of thyroid and ovarian extracts to individuals previously sterile render them

capable of procreation. I well remember a patient whom I saw some years ago with a prominent surgeon of this City. The woman had not menstruated for eight years. She had been married three years without pregnancy. At operation one ovary, which was cystic, was removed, and a number of small cysts were scattered through the other ovary. The surgeon was inclined to remove that but desisted at my suggestion. The woman subsequently came to me with regard to the possibility of procreation, and I suggested the administration of thyroid extract. Shortly after she menstruated, and this menstruation was followed by pregnancy, and she has borne three children. This, of course, is not any proof that the thyroid extract had anything to do with the condition. It is possible that a metabolism set up by the operative interference may have brought about changes resulting in pregnancy. I have seen other instances, however, in which the thyroid extract has seemed to me to have an influence in pregnancy. There are many cases in which because individuals have felt they were not ready for procreation have used measures to prevent it, and subsequently when they were desirous to have children they have found themselves incapable of procreation. It is just possible in this as in many other conditions the repeated inoculations rendered the individuals immune to the influence of the spermatozoa. We may have patients with inflammation of the genitalia, the result of efforts to avoid conception, rendering the soil unfavorable to the development of the ovum.

The question of sterility is exceedingly interesting. Not infrequently we find individuals married for a long time and anxious to have children, and finally after a long period of time pregnancy has occurred. One of these cases came under my notice some years ago. A woman married twenty-two years came to see me because of the increased size of her abdomen. Upon examination I had no hesitancy in telling her that she was pregnant. They could scarcely believe that pregnancy should have occurred after such a length of time, and yet that was the condition. It illustrates the truth of the assertion that while there is life there is hope. The question is one of great interest and value, and I appreciate very much having heard the paper of Dr. Miller.

DR. TRUMAN ABBÉ, Washington, D. C.—May I be permitted to tell you some of the things that have come to me from my reading, but without absolute data? It seems to me that one of the great factors in this matter is that for generation after generation people have been trying to reduce the number of their children. We have not followed our natural instincts, and if there is anything in adaptation to surroundings and the cultivating out of certain germs and tendencies in our nature it seems to me that we have done all that we could to decrease the fertility of the human race. The matter is not a one-generation proposition, but one which has been going on ever since families had responsibilities. They have been trying to reduce the number, and where life has been the most intense, as it is in certain parts of Europe, the decrease seems to have been the greatest; and, as our life here in America seems to be decreasing,

apparently the intensity is increasing—our families are decreasing. It seems to me that the most important factor is that we shall change the mental attitude of our people; encourage the early marriage and the large family; give the large family the advantages that are possible, but make the children fight for themselves and bring up themselves. It seems to me that that is the keynote to the treatment of the general proposition of sterility. Not that the pathological factors mentioned here to-night are not definitely important, but that this psychological factor is one of the big fundamental considerations.

DR. GEORGE ERETY SHOEMAKER.—The relation of appendicitis to sterility has perhaps not received the consideration it deserves. Those of us accustomed to removing the appendix as the chief inflamed organ independent of its secondary involvement in salpingitis recognize that adhesions due to appendicitis proper while stronger and more developed on the right side and less extensive upon the left, are often very widespread; especially if pus has formed and has pocketed behind the uterus. In the event of the removal of the appendix the adhesions will be gradually absorbed, but enough may still remain to seal the fimbriated ends of the tubes to nearby structures. This is a matter to be considered in the cure of sterility whenever the individual has had an attack of appendicitis.

DR. CHARLES C. NORRIS.—Dr. Montgomery has brought out an important point when he emphasizes the differentiation between a sterile marriage and a sterile woman. The lay public is prone to place the blame at the door of the woman, as we know this is by no means always the case. Our first step should be to determine which partner in the marriage is at fault.

The study of sterility in women is a many-sided problem. For practical purposes we may divide these cases into two classes. The first consisting of those in which there is some obvious reason for the sterility, such for example as massive bilateral pelvic inflammatory disease, or congenital occlusion in some part of the genital canal. The proper treatment of such cases is plain and in the majority of instances the sterility is a subservient symptom to other painful or more obvious clinical phenomena.

To the second class belong those cases in which there is no massive lesion. These are the type of cases which are generally spoken of as sterility cases. Their etiology is often obscure.

It is to this class of cases that I purpose to limit my discussion. Sterility of this sort may be the result of a variety of causes, some of the most common of which are hypoplasia of the uterus, acute antelexion, stenosis of the cervical canal, flaccid bilateral hydrosalpinges of the variety which cannot be demonstrated by a manual examination, diseases of the endometrium, abnormal reaction in the vaginal, cervical or fundal secretion, hypoendocrinism or reduced internal secretory action of the ductless glands, extreme obesity (it is not improbable that in some cases extreme obese may be caused by changes in the secretion of some of the ductless glands and, therefore, a concomitant of sterility rather than a causative agent.

It is, however, a fact that the chance of conception occurring in such cases is greatly increased if we can get the patient to reduce this weight by exercise). One of the foreign observers has recently reported a condition in which habitual early abortion occurs, so early in fact that conception is not usually recognized, the condition generally being thought to be a slightly delayed menstrual period.

These are but a few of the many causes for sterility. The majority are relative.

Thus one woman with an acute ante flexion may be sterile whereas another with an apparently similar uterus may conceive shortly after marriage, one stout woman with an apparently normal genital tract may conceive repeatedly and another may be sterile. In dealing with these cases it is customary and safest to not pronounce such a patient sterile until two or even three years have passed, and even then caution is advisable.

The point which I wish to especially emphasize is that sterility is a symptom and not a disease, and that to intelligently treat these patients they must be individualized and if possible the cause of the sterility discovered. The most uncommon practice of immediately subjecting all sterile women to some form of dilatative operation, often even without determining whether or not they are the partners at fault, is to be deprecated. The only cases in which dilatation is of benefit are those in which for some reason there is narrowing of the cervical canal. This may be the result of an acute flexion, may be congenital or even inflammatory in origin. In any event such a patient is likely to give a definite history of spasmodic or expulsive dysmenorrhea, that is, the dysmenorrhea will appear with the flow and the pain will be expulsive or labor-like in character, in counter distinction to the dull, heavy aching pain often appearing some time before the flow which is typical of pelvic congestion and does not necessarily indicate a stenosis.

Dilatation may be the treatment of last resort in many cases, but certainly in patients not exhibiting the expulsive type of dysmenorrhea should be considered only after other methods have failed. It seems almost unnecessary to state that pelvic inflammatory disease must be excluded before attempting any form of dilatative operation, the fact, however, that without an anesthetic there are a certain number of cases in which this condition is difficult to exclude and that this mistake is not infrequent is well known. The intrauterine stem pessary has in my hands given better results than any other method of dilatation.

DR. ALFRED HEINEBERG.—In Dr. Miller's paper he has ably presented this subject. He has mentioned Max Hühner of New York. I have been much interested in the work of Max Hühner and have had occasion to study fifteen cases by his method. From what I have learned in my study of these comparatively few cases I am quite convinced that there is a good deal more to be learned. I do not believe that the subject as Hühner presents it is complete. Much more than that which he has written is to be said. In 129 cases of sterility he employed a test by which he was able to determine the

presence or absence of active spermatozoa in the fundus of the uterus at the expiration of from twelve to twenty-four hours. The test is simple in technic, but some men to whom I have spoken said they did not think it practicable in America. Some weeks ago when I read a short paper on this subject and presented the work of Hühner some of the men present at the meeting were of the same opinion. Hühner's work consists in studying the effect of the vaginal, cervical, uterine and tubal secretions upon the spermatozoa. This is the routine I have carried out. When the subject has been properly presented to the patient and both husband and wife are anxious to have a child, I have yet to have a patient refuse to undergo the test. The test gives practically no pain to the patient and gives no more discomfort or exposure than the ordinary pelvic examination. The patient presents herself at your office within an hour, if possible, after sexual intercourse. The vaginal secretion, after having been removed by an ordinary platinum loop, is examined while still wet on the microscopic slide. Then the patient is asked to return in about five or six hours. At that time it is necessary to examine the secretion of the cervix as well as the secretion from the body of the uterus. The secretion from the cervix is removed with the loop and that from the body of the uterus with a small syringe. I have used for this work an ordinary Eustachian catheter of the smallest caliber fitted to a Luer syringe. The secretions are studied as at the first examination. They are studied again at the end of twelve hours and at the end of twenty-four hours; in all, four examinations for each case. In the cases which I have studied I have been struck with some of the facts which Hühner presented. In some cases in which the semen on previous examination showed a very large number of active spermatozoa I have been surprised to find, within half an hour after intercourse, very few in the vaginal secretion and most of them nonmotile. In the cervical secretion I have found spermatozoa, not so many perhaps as in the vagina, but much more motile. I have been struck with the marked difference in the motility of the spermatozoa in the vaginal and the cervical secretions. Patients with active spermatozoa in the cervical secretion within an hour after intercourse usually have a certain number in the secretion from the upper part of the uterus. These women in whom the spermatozoa in the cervical secretion early after intercourse has a lessened motility usually have no spermatozoa in the secretion of the uterus at the expiration of five or six hours. This test shows that in a large number of cases motility of the spermatozoa is destroyed by the acid vaginal secretion. I have been able to demonstrate that in a certain percentage the motility can be increased by treatment. In fact, I have four cases in which the activity of the spermatozoa has been increased by having the patient take alkaline vaginal douches for several days twice a day and particularly one hour before intercourse. When repeated examinations show—no matter what the physical condition of the pelvic organs may be—nonmotile or no spermatozoa in the uterine fundal secretions, we may feel fairly certain that it is impossible for the

woman to conceive. I believe this is the class of cases in which the patient should be subjected to abdominal operation purely for inspection to ascertain the condition of the tubes, where I believe we shall usually find the trouble. We should never lose sight of the importance of examination of the semen in all cases. In Hühner's series, 59 per cent. of the males were sterile; Reynolds of Boston found his percentage to be 50. In my experience about 40 per cent. of the men have been sterile. Therefore, before beginning treatment for the sterility of the woman it is well to determine the condition of the husbands. There are many other points which might be brought out; I simply wanted to present the few regarding Hühner's test for sterility.

Dr. MILLER, closing.—I feel that I have gained a good deal from the discussion of my paper and I want to thank the gentlemen taking part. I was very glad indeed to hear the last speaker refer to the Max Hühner test. I had made up my mind to try this test but have not yet had an opportunity of doing so. I make it a practice in all my cases of sterility to send the man for examination by a genito-urinary specialist to see if he is at fault. If we find live spermatozoa in the male he is not at fault. As Dr. Davis has said, age has an important bearing upon sterility. One evidence of this influence is shown by the presence of fibroids which usually manifest themselves in the later sexual life of women. I found that twenty-five of our 120 cases had these tumors which usually are seen after thirty years of age. I must confess that I know little about the influence of the thyroid and ovarian secretions and prefer not to theorize about the subject. I know we should all welcome any definite knowledge in this respect that might be gained by investigations. As Dr. Montgomery said, many sterile women are given thyroid and conceive, yet we do not know that the conception was influenced by the thyroid. I prefer not to put myself upon record regarding these things, especially with my patients; I have to tell them I do not know.

The second paper by Dr. I. S. STONE of Washington, took up the question of

THE LESSENING FERTILITY OF WOMEN.*

DISCUSSION.

Dr. JAMES M. BALDY.—I came here to listen, not to talk. Surely we have had a sermon of the old-fashioned kind; and it is about as useless as all sermons, with as much truth as we get from most sermons. What's the use in being as optimistic as our friend from Washington? It is not our nature. Perhaps the nearer Washington, the nearer to the South and the warmer the blood, the more optimistic one is; the more belief in what is not true, and the less scanning of human nature. There are plenty of good reasons why women should not have children and lots of times they would be fools if

* See original article page 454.

they had them; and they are not fools, but they generally know their business. In this they are perfectly justified. Lack of children is no crying evil; this is all nonsense. There are plenty women, save those you have and do not bother too much about those you have not. We ask for civilization and then cry against that which must come with it. What is civilization? Will you go back to the time when eight, ten or twelve children were in every family. If you do the woman will have no shame that the children are dirty and not decently clothed. Women of the civilized world do not want more children than they can properly care for. They give you enough children. Save those they give you before you demand more. If every woman bore four children the world would be overpopulated and an uncomfortable place to live in. The older I become, the more sense I think the woman has. There are plenty of children born. Women do their duty; they overdo it. Civilized life means intensity of nervous strain. Nervousness makes a woman unfit to bear children to the extent that formerly was common. If she does bear them to this extent she is doing a gross injustice to herself, her progeny and to her country. The dominating factor with the countries looking for more children is that they want soldiers. We doctors have no interest in that motive. Each one of you obstetricians knows that the modern woman having to meet the obligations of the day in which we are living is not fitted to bear six or seven children. The women have taught us that they do not want to have their lives wrecked and thus show that they know a heap sight more than we know. The trouble is that we have not learned and are still harping at the theory that woman was born into the world to bear children. All this may be true but it is also true that a man is entitled to a healthy wife for a companion.

The third paper by DR. R. J. SULLIVAN, of Washington, questioned

THE INDICATIONS FOR AND THE PROPRIETY OF ARTIFICIAL STERILIZATION.*

DISCUSSION.

DR. BARTON COOKE HIRST.—I have been very much interested in the subject which Dr. Sullivan brings before us; it is as anxious a question, I think, as confronts the conscientious physician. There are four types of cases in which I have deliberately sterilized women, and in which I would do it again; and, there is a fifth type of case in which I would do it in the course of an operation undertaken for some other indication. As an illustration of one type, I have an appointment to sterilize a woman whose physician writes me that she is pregnant for the sixth time, has mitral stenosis and myocardial degeneration with decompensation; that he regards the continuation of the woman's pregnancy as particularly hazardous and dangerous to life, and that if I agree with him he would suggest that her pregnancy be terminated. I not only agreed to do it but also to prevent

* See original article page 458.

her becoming pregnant again. To me, sterilization of that woman is perfectly justifiable. Another type of case is that of a woman who was admitted to the University Maternity, pregnant for the fourth time, and eight weeks pregnant when she entered the hospital. She had a systolic blood pressure of 200 with grave signs of toxemia and advanced cardiorenal disease. The woman had been told that she ought not to be pregnant. Her husband had also been told, but he paid no attention to the warning of the physician. I consider this a justifiable case for sterilization. A third type of case is the woman between thirty-five and forty with a bad cystocele who already has had five or six children. I have sterilized a number of women on this indication in the course of an interposition operation. In this connection it is interesting to observe that the method employed, excising a portion of each tube through a vaginal incision and sewing up the uterine cornu is not always as trustworthy as we would like to have it. Of the women so sterilized two have come back pregnant, although I excised an inch of each tube and sewed up the cornua as carefully as possible.

There is another type of case justifying this procedure. A patient was admitted to the University Maternity with the history that she had been married two or three years before. She had had one child and shortly afterward developed phthisis which had progressed alarmingly. Her physician had sent her to one of the sanatoria in the State. She improved, gained about 40 pounds in weight, the tubercular bacilli had disappeared from her sputum, her cheeks were rosy and she seemed to be in perfect health. She no sooner came home than she was impregnated. At the tenth week of her pregnancy all the original signs of phthisis had returned with their former intensity. She immediately fell off in weight, developed fever, and cough with tubercle bacilli in the expectoration. I induced abortion and then sterilized her by excising the tubes in the usual manner. There is a method of sterilization which I may use in the future. Doederlein's and Krönig's book on operative gynecology there is illustrated the removal of the tube and ovary through an incision in the groin. The method appeals to me as desirable for a temporary sterilization. If subsequently pregnancy became desirable, it would be only necessary to reopen the groin, release the tube from its fixed position in the inguinal canal and drop it back. This would seem to be desirable in the case just mentioned. Here was a young married woman with only one child, sterile for life. She might be entirely cured of her phthisis in five or six years and might then desire a larger family.

There is another type in which I would not deliberately sterilize a woman, but would do so in the course of another operation if I had opportunity. I recently delivered by Cesarean section for placenta previa a woman sent to me by the Social Service worker of the hospital. After the woman's recovery I was asked why I had not sterilized this woman. When I inquired why, I learned that the patient was feeble-minded and had a different father for each of her three babies. Had some one told me that before the

operation I certainly would have taken measures to prevent her becoming pregnant again.

So far as my practical experience goes, these are the types of cases in which sterilization seems to me perfectly justifiable. After all, as the essayist says, the question is one which must be decided by the individual physician from his experience and according to the dictates of his conscience.

DR. SWITHIN CHANDLER.—We should look at this subject from three standpoints: (1) With regard to the woman; (2) with regard to the health of the offspring; (3) with regard to the future of the offspring. With regard to the woman herself, if she have some organic disease which will be made worse by pregnancy—heart, kidney, or lung disease—it seems to me that we cannot ask her to give birth to a child. Regarding the child, if we had reason to believe that the future health of the child would be seriously impaired, it seems to me the operation should be done. In the third place, if there shall be no one to take care of the child in the event of the death of the mother. If its future is in doubt and the State does not take care of the children, it is a question whether we should ask that woman to bring forth an issue. If that civilization is established, not the civilization indicated by Dr. Baldy, but one of altruism, humanity and patriotism looking to the glory of the future we shall be in a position to determine in what cases the operation mentioned by the author of the last paper shall be performed.

DR. ALFRED HEINEBERG.—The question of the method of sterilization has been opened up in Dr. Hirst's discussion of this paper by Dr. Sullivan. Dr. Hirst has told us of two failures in his own practice in attempting sterilization during the performance of another operation. An experience which I had with two cases caused me to look up this subject. In one patient I removed, for inflammatory disease, or I thought I had removed, both tubes and both ovaries, and to my surprise, about three years afterward the patient became pregnant. In another case I removed both tubes and one ovary. That patient is now pregnant and will be delivered next month. In looking up the question of sterilization I found that there were only twenty-two cases of failure to produce sterilization by the methods employed, and that there has not been a single method employed in which there has not been failure. The method in which the largest number of failures resulted was that employed by Dr. Hirst, of excising a portion of the tubes. The method which gave the surest results was that of removing the cornu of the uterus and infolding the raw edges with musculo-muscular sutures and covering with peritoneum. The Kroenig method of temporary sterilization mentioned by Dr. Hirst was a failure in one case of Kroenig; tube slipped back and the patient became pregnant. There is, therefore, no single method so far devised, except, of course, removal of the tubes and ovaries and uterus which will produce absolute sterility; and, there is a case on record in which tubes, ovaries and uterus were removed and in which the woman became pregnant in the remaining stump of the cervix.

I simply want to add one suggestion in regard to the question of sterilization which undoubtedly is in literature but I have not seen it. The most vulnerable point at which to attack the root of the ovum is in the uterine wall itself. The common method is excision of the cornua of the uterus. It occurred to me that by destroying the mucous membrane of the muscular portion of the tube sterility would be sure and could be accomplished by a plunge of the hot cautery needle into the uterine muscle at the cornu along the line of intramuscular portion of the tube bringing up the remaining portion and uniting it over the wound. It seemed to me that if the mucous membrane of the intramuscular portion of the tube were destroyed by cautery the amount of scar tissue around this cauterization would result in positive sterility.

DR. TRUMAN ABBE, Washington.—One method of sterilization which I have not heard mentioned, and which is becoming more and more efficient, is that of deep radiotherapy of the ovaries. It is a method which entails no traumatism and is practically without risk. It is well worthy of consideration as a means of temporary and probably of permanent sterilization, depending upon conditions. While the method is new and its results not yet positive it claims consideration.

There is one other point to which I should like to refer; I come as a son of the warm and rosy South who believes in high ideals and dreams of the things for which the best civilization of the country ought to stand. I believe that a certain proportion of our population should be positively sterilized in the support of the rest of us who are not yet an expense to the State. There are a certain number of people who have been followed up by the societies and by men studying the question of heredity; it has been found that one woman has cost the State of New York in the last twenty years something approaching two million dollars. That two million has been paid by the people who work and are an asset to the State. Such state paternalism is one type of civilization. Now, it seems to me that the ideal civilization is that which stands for the laws of health, the family, the children, not the protection of the few who are weak-minded who break the laws of hygiene persistently and who must be supported by the State. I would much rather be part of a civilization which supports the useful families than be part of a civilization which supports every person indiscriminately and taxes the best of us to support the worthless fathers and mothers and the children born at the expense of the State. In the discussion of Dr. Stone's paper the Society is left on record, this is a joint meeting and as Secretary of the Washington Obstetrical Society I take the liberty of saying this—as supporting a standard of civilization in direct opposition to that of the highest ideals. The standard asset by that discussion would have us as obstetricians aid each woman by every means in our power to limit the number of her children as she wished. It does not seem to me that the Washington Society cares to stand for that record. Neither do I believe that the Philadelphia Society as an obstetrical society cares

to go on record in that way; and I would move that some comment be made in the Minutes which would modify the discussion of that paper.

DR. J. M. BALDY.—Of all the inconsistencies I have ever listened to, this beats them all. The first paper by Dr. Stone discusses the causes of sterility and its evils and insists on every woman having as many children as she can crowd into her life, and every man since has stood up and talked about the methods of sterilizing women some of which are absurd, some impractical. I may have sympathy for the woman who prevents conception for good reasons but I have little or none for limiting the excuses for wholesale abortions. However, in proper cases this is justifiable. I am a bit amused at the position taken by Dr. Hirst. I am not quite sure we are not feeble-minded, all of us. Some years ago I was asked by a prominent clinician in this town whether I would do an abortion upon a woman with incipient phthisis who had already had children. I said I knew nothing about the diagnosis of incipient phthisis, but that I had confidence in him and if he assured me that the woman had incipient phthisis I would do the abortion. He said there was no question about the diagnosis, but that he must first tell me that one of the best obstetricians in the city had said such an operation, though of undoubted benefit to the patient, was absolutely unprofessional and he refused to do it. I asked who it was and he replied, Barton Cooke Hirst. I did the abortion. I am very glad to see that my judgment of that time is so fully justified by what he now says. I feel, however, that there is a good deal of feeble-mindedness in some of his positions at present as first expounded. Why he should think it his duty to take the responsibility of preventing conception by doing a questionable operation just because a husband is a fool, I don't quite see. Of course, if a pregnant woman is in danger of dying we are warranted in helping her out, with the warning that her condition is such that pregnancy is dangerous; then if she and her husband transgress and trouble follows we can have no warrant for interfering. The man who does so puts himself in the position that he must do so again and again. Two fools had better die; let both husband and wife take the consequences.

DR. NORMAN L. KNIPE.—I am wondering why this discussion should be upon the production of abortion. The question has been upon the sterilization of women. This is entirely a sociological question and has little to do with medical ethics. I have not yet passed through the embryological stage which Dr. Sullivan has passed through. I believe very much along the line of Dr. Baldy. There are plenty of reasons for doing artificial sterilization of women. If life to-day were the same as fifty years ago there would not be the same indication for aiding women in this way; but it is not. We cannot live like the Russian Jew to whom a large family is an economic necessity. To many a young man receiving a salary of \$75 or \$100 a month, a large family is an economic calamity. An increased number in the home means an increased cost of living. An increased cost of living necessitates a decrease in the number of chil-

dren. This is not so acute in the country districts; there, six children cost little more than three, so far as mere maintenance is concerned. I think in large cities small families are an economic necessity.

There is no good reason why the advisability of artificial sterilization of women should not be just as conscientiously considered by the reputable physician as the necessity for the production of therapeutic abortion. I believe in salpingectomy for good economic cause. I do not believe that it is right to sterilize a healthy woman, who is nulliparous or who has had one or two children, just to suit her convenience. But I do believe that it is morally and even religiously right to prevent a woman who is not in good material circumstances from being obliged to give birth every year or two, to a child who cannot be properly provided for.

DR. JOHN A. MCGLINN.—I am sorry that Mr. Roosevelt is not present at this meeting because only he could adequately reply to the views which have been expressed. It is also too bad that certain ladies of New York who desire to publish broadcast methods for the prevention of conception, are not present for they certainly would be greatly encouraged in their pernicious work. Some of the ideas expressed here to-night can be termed nothing short of asinine. The idea, that because a man in the City does not earn a large salary should constitute a cause for the sterilization of his wife, is a curious sort of philosophy to me. I have rarely seen an unhappy family where there have been a number of children. I have seen lots of unhappy families where there have been none or but one child. Small families are not due to economic causes or the fear of invalidism on the part of the wife. The majority of them are due to the fact that the husband and wife do not want their pleasures curtailed.

It seems to me that instead of a young man and a young woman raising hell at night, it would be far better morally and economically if they would raise some children. It has been said here to-night that large families breed incompetence. That the family should be small so that the children could be well educated and trained and we would therefore have the survival of the fittest. Who does survive? Uncle Joe Cannon in a debate on the immigration bill quoted from the census of 1799, and but few of the family names which appeared in that census appeared in the last census. Of all the names which appeared in the census, there does not appear any at the present time of the men and women who are doing good work. In other words, if it had not been for the influx of the immigrant with their large families, this country would be in the same position as far as population is concerned as is France to-day. Dr. Baldy evidently has never had any experience of the Polish immigrant. The Polish immigrant has a large family. He not only dresses his children well and educates them, but always has enough money laid aside to pay a physician for his services, and that cannot be said for the American family who have but one or two children. There are worse evils than having large families. Large families don't always mean poverty. Children oftentimes mean comfort to parents in their later life. It would be a very unfortunate thing if it should go

out into the community that the prominent obstetricians and gynecologists of Philadelphia and Washington believed that the having of large families was an undesirable thing for the State and stood ready to inform people concerning means of prevention when children were not desired. There is no doubt that as a result of a false philosophy concerning this matter too many abortions and unnecessary sterilizations are done.

DR. E. E. MONTGOMERY.—The subject of sterilization I consider one of very great importance, especially so in the class of people known as defectives and feeble-minded, in whom procreation is most active. In such people we have examples of the case mentioned by Dr. Abbé, and Margaret the mother of criminals a feeble-minded woman who was the mother of eight children by as many fathers can be added. She cost the State of New York two million dollars for the maintenance of her offspring in almshouses and the execution of them for murder. It is often regarded as a joke when the "village softy" marries a woman of equal intellect, yet these individuals are going to give birth to children equally feeble-minded or worse. In this way the cares of the State are increased in preparing for their segregation. Such people are a care throughout their lives, not only in maintenance, but in the prevention of the propagation of their kind. The City of London has been undertaking the care of such people and has found it a great tax. It is certainly a matter of great importance that the community should be protected from them, but segregation is not sufficient. In England a law was passed to prevent their marriage but this does not correct the evil, for the greater number are born out of wedlock. The subject of sterilization should be legally considered as a means of prevention. I would look upon the question of abortion to relieve individuals who have deliberately subjected themselves to the possibility of fecundation as one of serious ethical import, and would hesitate to decide that it was my duty to institute abortion to save such individuals.

DR. WILLIAM H. GOOD.—Dr. Baldy has criticised much of the discussion here to-night as "twaddle and poppycock" I was wondering whether or not Dr. Baldy had not contributed more than his share. It seems to me that in the matter of decreasing fertility Nature very kindly takes care of those who believe in but one or two children in a family. They soon die off and their places are filled by those willing to lead lives more nearly in accord with normal biologic law. As a member of the Philadelphia Obstetrical Society, I would not care to go on record as endorsing what Dr. Baldy has stated to-night as his views.

DR. DANIEL LONGAKER.—I wish to add a mild word of protest regarding the trend of the discussion to-night. The hour is too late to go into details. It is evident that if this community or any large community wanted to find an excuse for its individual and personal shortcomings, it need simply refer to the practice and example of its physicians since it is comparatively infrequent that they have families. I think it is greatly to be deplored that to-night we have had boldly advocated the expediency, the desirability,

even the morality of voluntary sterility as a normal condition of a state of civilization. The Malthusianism, the pessimism, and the rotten philosophy of it! Dr. McGlinn is right, my friend on the left, all wrong.

DR. SULLIVAN, closing.—I had no idea of stirring up such a hornet's nest, but the matter is not laid at my door entirely for if you will remember the title of this paper, it is "The Indications for and the Propriety of Artificial Sterilization." I spoke about none of the economic conditions, which I might have very personal views upon, and I would not care to speak about them. So far as the means of sterilizing women are concerned, I did not say that that was a part of the theme at all. The sterilization of the feeble-minded is not a question for us to decide now. The opinions of psychologists and gynecologists of our country are at sword points. The best men in the pursuit of knowledge of this kind claim that in time they will give us ground on which we may base the indication for sterilization. At present they believe that many of the laws concerning this matter will not hold, and they urge us to wait. I think I have had some experience that would lead me to want to sterilize mentally defective persons; I believe they should be sterilized, but we have no grounds from the mental specialist's standpoint, and none from the legal standpoint. In the States having enacted such law it has been repealed as unconstitutional. I should like to thank Dr. Hirst for his great kindness in handling the subject. I think I should tell him that a woman whom I delivered recently in Washington had received the sterilizing operation at his hands some two or three years ago in Philadelphia.

TRANSACTIONS OF THE BROOKLYN GYNECOLOGICAL SOCIETY.

Meeting of May 5, 1916.

The President, DR. WILLIAM P. POOL, in the Chair.

DR. CARROLL CHASE reported a case of

HEMORRHAGE FROM RUPTURED HYMEN.

Last summer he received a hurry call about midnight to see a servant and found a young woman, aged twenty-two, almost pulseless and in serious condition from hemorrhage. It was difficult to get a history. At first she said that as far as she knew the condition was menstruation, although she had never bled so profusely before. He insisted that it could not be menstruation and after some delay was allowed to make an examination and found that the woman was literally bleeding to death from a ruptured hymen caused at the first intercourse, which she then admitted had occurred that evening.

A thick hymen was found to have been torn posteriorly and a large vein could be seen still bleeding. It was a simple matter to tie it. Quite evidently she would have bled to death if the vein had not been tied. It might be added that she had never had any symptoms of being a "bleeder."

DR. E. H. MAYNE reported a case of

PROLAPSED INTESTINE THROUGH RUPTURED UTERUS.

Three weeks ago last Thursday night, about eleven o'clock, a woman was brought into the hospital with some intestine projecting from the vagina. She was twenty-four years of age with a history of a four or five months' pregnancy. The fetus had come away about four o'clock that afternoon but the placenta had not been delivered and the attending physician thought it should be removed. The patient was anesthetized and an attempt was made to remove it. In endeavoring to get it out with a curet, the doctor had some difficulty and the first thing he knew there was some intestine in the vagina. When her abdomen was opened about midnight it was almost filled with blood. There was an opening above the internal os which appeared to be large enough to admit three fingers and stuck through that was a loop of small intestine. The intestine was withdrawn and as the uterus seemed to be about seven-eighths torn through a hysterectomy was done. He had to resect about 26 inches of small intestine. The mesentery of the sigmoid was punctured in three places and the peritoneum was torn in several places by the curet. The woman was in great shock, pulse 160, but she has since then greatly improved. About seven days after the operation she developed a fecal fistula which is discharging slightly, but the bowels have moved naturally and I believe the fistula will close. There was some difficulty in getting small thread for the anastomosis and they had to use coarse thread which he thought made some difference in the result.

DR. J. R. TAYLOR reported a case of

CHOLELITHIASIS.

This was a case of long-standing gall-bladder disease with a solitary stone. The patient was fifty-three years of age, with a history of trouble in the epigastrium for fifteen years. She was a large woman weighing about 185 pounds. The gall-stone was found to be tightly impacted in the neck of the gall-bladder which, to the casual observer had the appearance of being in a normal condition. Moynahan and others have stated that if the gall-bladder presents a bluish color it is to be presumed that it is healthy. This gall-bladder was apparently not enlarged, the fundus was not tense and presented from the outside the characteristics of having normal fluid within. After making an incision into it, it was necessary to exert some pressure to force out a very thick black fluid. The stone had a well-marked groove on the left side due to pressure from the hepatic duct. The only way it could be extracted was by getting the

finger down behind the pylorus and working it out gently from below. The stone at the time of extraction was somewhat soft. The lower portion is markedly yellow in color due to cholestrin, apparently. It measures $1\frac{5}{8}$ inches long, $1\frac{3}{16}$ inches in diameter and weighs 260 grains. Since the operation the patient has been having a normal temperature.

DR. CLARENCE R. HYDE read a paper on

TUBERCULOUS PERITONITIS.*

DISCUSSION.

DR. GIBSON.—I do not know that it is a fact that the Italians are more prone to tuberculous peritonitis than other races, but at St. Peter's Hospital we see quite a number of Italians with it and it has been our custom to open the abdomen, drain off the ascites and not to remove any tissue. There have been several cases of tuberculous salpingitis where the tubes have been removed without trouble, but if the appendix is removed one is apt to get a fecal fistula. It is hard to follow up many of these cases as they are often taken back to Italy by their relatives. We have noticed that there seem to be more of the process about the head of the cecum and lower portion of the ileum and it is often a temptation to remove the appendix which seems so obviously diseased. Recently there appeared in the International Abstract of Surgery, an abstract of an article by Ligabue, who reported the results in sixty-six cases of tuberculous peritonitis which were treated by simple laparotomy. In 25.75 per cent. of the cases the peritoneal involvement was secondary. He states that permanent recovery was obtained in 65.07 per cent. of the cases and that the earlier the case is seen the better the results. This seems a very large proportion of recoveries and is rather hard to believe. His theory is that the removal of the fluid carries away a large amount of the toxins and causes a blood serum exudate which is rich in antibodies.

DR. MAYNE.—I think too much stress has been laid upon the removal of the appendix in these cases—it should not be removed. About five years ago I saw a case where a tuberculous appendix had been removed and the operation was followed by a fistula; nine attempts were made to close it without result. In Jackson's *Surgical Diagnosis* there is an excellent article on ileocecal tuberculosis which I think is in line with Dr. Gibson's remarks, agreeing that there is greater involvement at the terminal portion of the ileum and cecum. I have had two or three cases and I believe though that tuberculous peritonitis started at that point. I recently saw a case that had been operated upon four years ago by me and at the time of the operation I removed a large quantity of fluid. The case was interesting for the fact that the skin was much pigmented about the face and arms, so much so that Addison's disease was suspected. At the operation no attempt was made to remove the appendix though it was much involved as well as the cecum; the fluid was removed and the abdomen closed without drainage. Within six months the

* For original article see page 466.

pigmentation disappeared though the fluid continued to form and it was necessary to tap her three times subsequent to the operation. I then began to use tuberculin which was continued for ten months. She has made a complete recovery, has gained 40 pounds and there is no sign of pigmentation.

DR. MCNAMARA.—After listening to Dr. Hyde's paper calling our attention to our defects in the study of tuberculous conditions, and when we realize that tuberculosis attacks every organ of the body, it is not surprising that we should be lacking in the knowledge of tuberculosis in all its phases, neither are we to be judged guilty when we fail to make a diagnosis. I remember a case that I saw operated upon by my colleague, where there was a tremendous amount of fluid; the abdominal organs could not be seen. She was extensively opened and drained and is now draining. I question the rule that to operate early before the antibodies are developed would probably make an unfavorable operation: whereas a late operation is more favorable. One of the most important points is to make a diagnosis by exclusion; if it is not like anything else it is safe to call it tuberculous peritonitis.

DR. SHOOP.—My experience with tuberculosis of the peritoneum is limited to two cases, one seen with Dr. Carroll Chase and one in my own practice. The latter I reported in a paper read before this society about eight years ago on "Tuberculosis of the Uterus and Adnexa." This case had been diagnosed by a physician in the country as probable tuberculosis of the tube and ovary. When I saw it shortly after I recognized in addition a chronic appendicitis. I removed the left tube and ovary and a tubercular mass extending from the cecum to the uterus which included the appendix, right tube and ovary. The peritoneum was studded with tubercles; adhesions are general. The patient did well for twenty-four hours, then began to fail and died the next day. I did not drain the case and afterward thought that should have been done. It was formerly taught that the entrance of air with its content of oxygen was the curative agent in these cases and keeping an opening for a few days for its entrance would allow it to act thus beneficially. However, the weight of argument to-night seems to be not to drain but to close the wound entirely.

DR. WALTER TIMME.—One of the cases mentioned brings up the matter of pigmentation. It is not necessary to have disease of the adrenals to have this condition, any tumor or mass which interferes with the proper function of the sympathetic system may produce pigmentation and you will occasionally see cases of unilateral pigmentation; I have seen two in the last year. In one the cause proved to be a tumor mass on one side, far back, which impinged upon the main fibers of the splanchnic nerves, and removal of the tumor diminished the pigmentation.

DR. TOOL.—The statement made by Dr. Hyde regarding tuberculosis of the tubes rather varies from what is usually believed to be the rule. Some observers state that it may be primary in the tube. Just how it gets into the tubes without affecting the other organs

is not easily understood, but we do get tuberculosis of the lungs without throat and nose infection. It is possible that in tuberculosis of the male there may be a transmission of the disease through vitiated spermatic discharge. I think it is sometimes a fact that the uterus escapes when the tubes become involved and later the peritoneum. I have made it a practice to remove the tubes unless the disease has gone so far that it would be of no use.

DR. WALTER TIMME read a paper on

THE ENDOCRINE GLANDS IN THEIR RELATION TO THE FUNCTIONS OF THE
FEMALE GENERATIVE ORGANS.*

DISCUSSION.

DR. HYDE.—My own experience in the use of the glandular extracts is limited to a series of 100 cases and in only one case did I obtain a satisfactory result. The fact of the matter is that our empiricism has been due to our not knowing enough about the subject.

DR. GIBSON.—Last week at a meeting of the Woman's Hospital Society one of the papers was upon the effects of the glandular extracts in a series of cases of artificial menopause and of natural menopause with more than the usual vasomotor disturbances. The conclusions were that large doses of ovarian extract were necessary and that the effect was better if a small amount of thyroid was added. The cases that bother me are those which begin to take on weight at about the thirtieth year, which have a diminishing amount of menstrual flow and which have various vasomotor and psychic disturbances. I have been using various combinations of ovarian, thyroid and pituitary extracts but the results are, as a rule, not satisfactory. How are we to tell which substance is indicated?

DR. McNAMARA asked if there was any danger in the use of these substances either singly or in combination.

DR. CHASE asked if Dr. Timme would state what the condition was in women who were irritable and bad tempered at the menstrual period. They are fairly normal up to the time of menstruation when they would show a great deal of nervous disturbance.

DR. SHOOP asked if there was any difference in the secretions of the glands at various periods of the year and could manufacturers be prevailed upon to pay attention to this matter.

DR. TIMME.—In answering Dr. Gibson's question I would say that there is no one condition to which any one glandular extract will apply. There are no two women who are alike and there are eight or ten variables in the treatment which may be used singly or in combination and the number of combinations is beyond our experience. Each case must be studied upon its separate requirements. Generally I might say that those patients who show a certain amount of infantilism may be benefited by the anterior lobe of the pituitary body, because of its stimulating effect upon the growth of the ovaries, and if given early enough it may be of benefit, but by the time the woman is thirty it might be impossible to do anything for her.

* For original article see page 474.

Regarding seasonal variations, the thyroid of the sheep is most active in the spring and one firm takes the glands only at that time of the year. Other firms do not always take the same precautions and it is presumable that on that account the substance does not always produce the desired effect. I place the patients under my care on tablets with which from experience I do get results. Manufacturers are said to take glands, especially the pituitary, from animals that have been spayed, and such extracts may do harm for it is an abnormal pituitary body and if the physician is not careful he may get results for which he ought to hold himself accountable. Most of the glands have a greater effect in the spring than at any other period of the year; whether it is due to the greater amount of sunshine or not we cannot say. If you want a hypofunction with diminished effect, the glands taken in the autumn have a better chance. The treatment is entirely empirical. In cases of obesity with limited menstruation, help can be obtained from small doses of thyroid. As to the danger from the use of thyroid extract; it may be great because if you use the wrong doses of the gland you may get an opposite effect, which may be seen in the general bearing of the patient, depression, loss of weight, tachycardia. Too much adrenalin may cause symptoms of fatal collapse in a few days; it will bring up the blood pressure for a certain length of time and then if pushed you may get the opposite effect with intense shock. Regarding the irritability of patients at the menstrual period; if we suffered from a feruncle once a month perhaps we ourselves would be irritable. The hyperirritability must be studied and the treatment administered depending upon the original organ affected. How are we to find the missing link; the original gland at fault? That is where the crux of the treatment lies. There are certain features that impress themselves upon the examiner as having relation to the effect of various glands. Eyes close together or far apart are due to dystrophy of the pituitary gland. In women the pubic hair is limited to a horizontal line, in the male it goes up higher in the midline toward the umbilicus; in women of the male type this horizontal line will be absent. Another woman at thirty-five looks like a child, red cheeks, a complexion of peaches and cream; that is one in whom the thymus gland has acted too long instead of ceasing to impress its effect at puberty, and the woman retains some of the childish habits; she probably has enlarged tonsils. Here the pituitary and thyroid glands have not been able to overcome the effect of the thymus. Quick flushing of the skin means an increase of thyroid activity and whiteness is due to the adrenals; red marked with white on the sides is due to a combined disturbance of the two. There are certain landmarks which we learn to distinguish, each of which has an endocrine peculiarity, and if that one gland is given in treatment there will usually be a remarkable change. I am not an extreme enthusiast. Endocrine therapy may be new to some of you gentlemen, but to us the theories are pretty well established empirically, curious though they may seem. In the last three or four years, with the exception of a little digitalis, and perhaps a little

morphia and arsenic, I have prescribed practically nothing but endocrine gland extracts. I now get better results than I ever did before in over ten years of practice. You must analyze each case and not prescribe by any one rule as so many text-books advise.

REVIEW.

GYNECOLOGY. By WILLIAM P. GRAVES, A. B., M. D., F. A. C. S. Professor of Gynecology at Harvard Medical School; Surgeon-in-Chief to the Free Hospital for Women, Brookline; Consulting Physician to the Boston Lying-In Hospital. Octavo of 770 pages, with 303 half-tone and pen drawings by the author and 122 microscopic drawings by Margaret Concrey and Ruth Huestis. Sixty-six of the illustrations in color. Philadelphia and London: W. B. Saunders Company, 1916. Cloth \$7.00, Half Morocco \$8.50 net.

It is not often that one finds a new work on gynecology possessing so distinct an originality, such practical good sense, and so much of the personality of its author as this book of Dr. Graves. We predict for it success and long life. Departing from the traditional arrangement of gynecological text-books the author divides his work into three parts.

Part I deals with the physiology of the pelvic organs and the relationship of gynecology to the general organism. This latter subject is to be especially commended as, while a comparatively new departure, it is presented as completely as present knowledge will allow and in a way which impresses the importance of the correlation of all branches of medicine and surgery.

Part II includes a description of diseases essentially gynecologic and is given compactly so that the student, for whom this section is especially intended, may not be burdened by too formidable an array of facts. In the description of each disease the underlying pathological processes are described, but the histologic, or rather the microscopical detail, is taught by drawings of microscopical sections with full descriptive legends appended, the author feeling that these details can better be learned from drawings than from tedious description. In a similar way the surgical principles involved in the treatment of each disease are discussed but the technic of operation and the illustrations are reserved for

Part III, which is devoted exclusively to the technic of gynecological surgery. As it is impossible to include all operations in a book of this scope, only those are described which, in the judgment of the author, have seemed best suited to the special requirements presented. Of course this means that many procedures and methods which some may think more valuable are necessarily omitted and it leaves a number of points open for adverse criticism. These omissions, however, in the eyes of the average reader, may be considered an advantage as making it less confusing for him to choose, and they certainly add to the personal appeal of the volume and to its value as a text-book for students.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

CONGENITAL OCCLUSION OF THE BILE DUCTS.*

BY

JOHN FOOTE, M. D., AND RALPH HAMILTON, M. D.,

Washington, D. C.

(With two illustrations.)

CHEYNE in 1801, in his "Essays on Diseases of Children" mentioned "original and incurable malconformation of the liver," and ascribed the condition to "an impermeable thickening of the beginnings of the hepatic ducts." The pioneer among modern writers to collect case histories and make a study of this interesting condition was Thomson(1), of Edinboro whose original brochure written in 1892 and later amplified into a subchapter in Albutt's System of Medicine has become a classic. Forty-nine protocols were cited and analyzed by him, in his original publication. Rolleston and Hayne(2) in 1901 added ten more and Lavenson(3) in 1908 reported the total as sixty-two. In 1911 Howard and Wolbach(4) reported fourteen additional cases. Milne, however, in a critical review published in 1912 criticizes the previous literature on the subject(5) and excludes Lavenson's, Hochsinger's and other cases from consideration on the ground of incomplete pathological evidence, thus bringing back the total number of authentic cases to seventy-eight. Additional cases have been reported by Nieman(5), Sugi(6), Merle(7), Moschowitz(8), Bohm(9), Elperin(10), Hoeg(11), Ylppo(12), Marien(13), Carbo-nell(14) and Hess(15) bringing the total to about ninety. While it cannot be looked upon as a rare condition, it is still infrequent enough to justify careful consideration of additional cases. This is especially true as regards the factors bearing upon etiology.

* From the Pediatric Department of Providence Hospital, Washington, D. C., and the pathological laboratory of Georgetown University. Read before the Washington Obstetrical and Gynecological Society.

Clinical Course.—An invariable uniformity characterizes the clinical histories of infants suffering from this condition. *Jaundice* appears at birth, or shortly after. *The stools* are either clay colored or colorless. *The urine is deeply pigmented.* In a summary of sixty cases thirty-nine were reported as having been born jaundiced. The appearance of the jaundice varied in the other twenty-two from one day after birth to five weeks (Skormin)(16). The pigmentation is very faint at first, becoming more intense after three or four days. As the condition progresses the sclera become deeply tinted and the skin assumes a characteristic greenish-yellow tinge. The jaundice is constant, persistent; it shows no remissions. Even when the skin does not show a deep pigmentation, the urine will stain the napkin bright yellow, more pronounced indeed than the urinary discoloration accompanying the deepest possible skin pigmentation in other forms of biliary obstruction. The stools in most cases show no bile from the very beginning. Normal meconium is usually passed, and the stools become progressively yellow merging into, and finally becoming pipe clay in color, and resembling junket both in consistence and appearance. Rarely traces of bile are found in the stools, as reported by Hess, but this is invariably the result of transudation of bile salts through the intestinal walls from the liver or larger bile ducts, the intestinal wall at autopsy showing bile stains.

Nutrition is fair for a time, but eventually a malnutritive state results. In the writer's case the infant not only thrived for a time but passed through a respiratory infection of rather severe type. Early hemorrhages are noted in a few cases, and hemorrhages practically always appear eventually. Cheyne ascribed this bleeding to its proper cause, "bile in the blood." An anemia of the secondary type, progressive in character, is always present. Death usually occurs about the fourth month, but ranges between sixty-two hours (Glaister) and eight months (Lotze), to nine months (Niemann) (17 and 18). The hemorrhagic tendency or some intercurrent respiratory infection are the usual direct causes of death. In Thomson's forty-nine cases thirty-one suffered from hemorrhage, of which seven were subcutaneous, one conjunctival, six umbilical, two nasal, one hemoptysis, four hematemesis, eight enteric, one gall-bladder, eleven wound. The experimental work of Ribadeu on guinea-pigs shows that a remarkable degree of anemia may be produced by ligation of the bile ducts. The hemolytic action of the bile salts is so well known that there can be little doubt as to the important rôle they play in the causation of this anemic state. The exclusion of bile from the intestine is of secondary importance in comparison.

In those cases which lived for several weeks or more autopsy showed an independent outlet from the pancreas to the intestine.

CASE I.—Nathaniel R., male, white child aged five months and two weeks. Father and mother are both living and healthy. One other child in family, born normally, aged ten and at present is in good health. The mother has never had any other children, and has



FIG. 1.

suffered no miscarriages. Had slow, difficult labor with this baby, was very toxic and eclampsia was feared, albumin and casts having been found in the urine previous to and during labor. Duration of labor thirty hours with delivery by high forceps. Child weighed a little less than 8 pounds at birth and was apparently normal.

Water was fed until the fourth day after birth when the child was put to the breast. Normal meconium was passed and the icteric tint was not observed until maternal nursing was begun. Was nursed for a month, the jaundice persisting, and then as he seemed hungry additional feedings of condensed milk were given. After the first

week the stools became white and remained in this condition. Was seen by the writer (Foote) two months after birth in consultation with the physician in charge, Dr. Joseph Mundell. The weight had remained stationary for some time, but nutrition improved when weaning was begun and the infant was given a low fat dextri-maltose food. A tentative diagnosis of congenital occlusion of the bile ducts was made at this time. The family then removed to another city where the baby suffered an attack of pneumonia from which he recovered, his condition continuing to improve until he weighed 9 pounds. At this time serious digestive disturbances arose accompanied by loss of weight and the baby was brought back to Washington and placed in the Pediatric Wards of Providence Hospital, entering March 4, 1914. Complaint, persistent jaundice said to be due to congenital obliteration of the bile ducts. No fever, no prostration, sleeps badly but is active both mentally and physically. No vomiting, slight regurgitation after feeding rapidly. One movement in twenty-four hours, color white and appearance like junket; rather constipated and with a fetid odor, but no mucus and no blood present. No cough, and a very slight nasal discharge. Physical examination: Temperature 98.6, pulse 110, respiration 30. Weight 9 pounds. Underdeveloped and rather poorly nourished male child. Skin flabby, greenish yellow in color. Tissue turgor much diminished. Very active mentally; laughs and plays when not in pain. Anterior fontanelle, open; posterior fontanelle, almost closed. No craniotabes and no rosary or enlarged epiphyses. Neck not rigid, and no retraction of the head, pupils normal; sclera yellow. Tongue slightly coated; no teeth, gums normal. Throat normal. Ears show no discharge; drums normal. Slight mucoid nasal discharge. Heart impulse and outline normal. Lungs normal. Abdomen pendulous. Liver dullness, upper border in mammary line above third rib. Edge very smooth and felt 11 centimeters below costal margin in right mammary line. Intestines, generally tympanitic. Penis shows scar from a dorsal circumcision. Blood: Reds, 2,600,000. Whites: 12,200. Hemoglobin, 40 per cent. Differential: Red cells show poikilocytosis and anisocytosis. No nucleated forms. Whites, polymorphonuclear 40 per cent., small mononuclear 35 per cent., large mononuclear 25 per cent. Urine, S. G. 1.014, acid. Albumin absent. Sugar absent. Urea, 2.1 per cent. Bile present. Urobilin and urobilinogen absent. Stools show abundance of fat soaps and a very small quantity of free fat. Bile and bile salts are absent from the stools.

March 6th. Fed protein milk with 4 per cent. maltose-dextrin, eight feedings of 4 ounces in twenty-four hours. Normal salt solution given by rectum. Flatus expelled in large amounts resulting in a reduction of abdominal tympany.

Mar. 7th to 9th. Condition shows less irritability; tries to play and laugh.

10th. Weight 9 pounds 4 ounces.

14th. Irritable and losing weight.

18th. Continued loss of weight, 8 pounds 2 ounces.

23d. Ecchymotic spots appearing. Very restless. Weight

8 pounds 12 ounces. Nose bled at night. Stool shows occult blood.

24th. A slight diarrhea.

25th. Salmon-colored defecations showing free blood. Pulse rapid. Died at 4.50 P. M.

Autopsy.—Body of a poorly nourished male child. Skin of an icteric hue with a slight olive tint. Muscles somewhat wasted. Lungs normal in appearance, bronchial glands enlarged. Heart dilated, especially right auricle. Intestines pale with mesentery and omentum scanty and transparent and almost free from fat. Liver, dark green in color with granular surface. Capsule strips with little



FIG. 2.

difficulty. Right lobe very large; quadrate lobe separated from the rest of the organ by a large amount of connective tissue. On section, liver substance shows dark brown surface with greenish granules and cuts with some gritty resistance. Weight after Kaiserling 280 grams. Gall-bladder about 1 centimeter in length with walls very much thickened. On section shows a small lumen filled with a clear syrupy fluid. Cystic duct for a distance of about 1 centimeter dilated to the size of a crow's quill, then becoming cord like and merging into the capsule. Common duct replaced by a small cord of connective tissue. Hepatic duct absent. Lymph glands at root of liver much enlarged and of a pink color. Hemolymph glands generally enlarged.

Spleen elongated by pressure against costal margin; much enlarged and of the feline type. Accessory spleen about 0.6 centimeter in diameter. Duodenum shows an imperforate papilla of Vater and a pancreatic duct opening directly into the duodenum 3.5 centimeters from the papilla of Vater.

Microscopic sections of the liver reveal the presence of a biliary cirrhosis, bile stasis, increased production of perilobular connective tissue with round-cell infiltration and proliferation of lumenless bile ducts. Numerous sections of the cord of connective tissue representing the common bile duct fail to show the presence of any structure resembling a duct.

The pancreas shows the normal histologic structure. No important changes noted in other organs.

Theories of Origin.—An analysis of the cases so far reported is confirmative of the congenital nature of this disease. *Labor* was so uneventful as to excite no comment in the histories of a majority of the cases. In a minority, as in the writer's case, the labor was prolonged. Abnormal labor, however, was the exception rather than the rule. *Sex* probably has little or no influence, although in Thomson's series of thirty-four cases, twenty-one were boys. *Family* influences may be eliminated, for while Benz reported two cases of persistent jaundice in the new-born resulting in death as having occurred in the same family, obliteration of the bile passages was not found, and the disease was the more rare condition known as recurrent family jaundice. *Syphilis* has been reputed to have an influence, but syphilitic obstructions are acquired and not congenital. They are not true cases. The application of the Wassermann blood test, with negative findings in a number of recent cases, has definitely eliminated a luetic taint in the etiology. Similar conditions are found clinically in syphilitic hepatitis, and Beck's (18) case belongs to this group. Like cases have been reported by Rolleston (19) and others, in which the liver sections showed the intercellular type of cirrhosis rather than the characteristic monolobular changes seen in congenital occlusion of the bile ducts.

The Theories of Rolleston and Lenzon.—Rolleston (20) maintains that the cirrhosis of the liver is the primary condition and the bile duct occlusion a secondary process. Some poison secreted by the liver causes first a hepatitis and later a cholangitis. The inflammatory process beginning in the liver lobule descends to the larger bile ducts and finally obliterates them. Against his theory is the fact that when death occurred soon after birth, as in Griffith's case, the liver changes are not marked while the bile ducts are fibrous cords.

Lavenson(3) holds that the condition is an anomaly of development. He points out the fact that the bile ducts in their primitive form are solid cords, the fibers of Remak, and that it is the hollowing out of the centers of these cords which results in the formation of the bile ducts. Failure of this lumination in any portion of the future bile duct may cause the disease. This embryological theory is well founded. According to Hertwig the hepatic system first makes its appearance as a solid cord emanating from the gut-tract about the third week of intrauterine life. From the branching end come the bile capillaries; the hepatic duct is formed by the proximal end. Cleavage from the gut occurs and the mass lies free in the abdominal cavity. A second budding out now occurs to form the common bile duct, which unites with the previously formed hepatic duct. Statistics show that a majority of the occlusions occur in the neighborhood of the junction of these two radicles, the hepatic ducts nearly always being patulous above, while the common bile duct is frequently open from below. As will be seen later, anomalous conditions in other portions of the tract occur, but the embryological history of the hepatic system fits into the theory of failure of lumination too closely to be regarded as a mere coincidence.

Wrinka held that the force with which bile is expressed from the liver in difficult labors was responsible for obliterative inflammations of the bile passages. He reports in this connection a case of occlusion in an infant born in tedious and difficult labor. Four similar cases were reported in Virchow's *Archives* in 1867. Yet the relative frequency of difficult, or at least tedious, labors is in marked contrast to the great rarity of true catarrhal jaundice in the infant.

As to the theory of the syphilitic origin of this condition, it is now quite clear that, while congenital syphilitic hepatitis may cause stricture of the bile passages, such cases are separate and distinct from the condition we are discussing, differing in clinical history, gross lesions and histological findings as well as in the clinical laboratory tests and especially the Wassermann reaction.

The evidence so far adduced seems overwhelmingly in favor of the developmental origin of this disease as a failure of lumination in the primitive bile ducts followed by a secondary hepatitis and a liver cirrhosis of the biliary type. We are forced to agree with Milne(5) that "summarizing the facts, both clinical and pathological, it seems as if almost every evidence indicates some congenital malformation as the cause of this group of cases of jaundice of the newly born. In only very few cases has the lesion been associated with other congenital deformities."

Pathology.—The liver is always enlarged. When death occurs early in the disease liver changes are not so marked as in the more protracted cases. The degree of liver involvement seems directly dependent upon the duration of the disease, the cirrhotic condition becoming more marked in cases where death is delayed. The cirrhosis is largely of the monolobular type. Rolleston and Hayne(20), however, assert that the cirrhosis is of the mixed, or multilobular type, at least in part. Portal, or multilobular, cirrhosis has been described as that form of hepatitis in which the toxins gain access to the liver through the portal vein, as differentiated from biliary, or monolobular cirrhosis, when the toxin is supposed to enter by the hepatic artery. But, as Milne(5) points out, and as we all know, an extensive anastomosis occurs between the terminal branches of the hepatic artery and the portal vein in the liver, and poisons entering by either one of these channels may reach the same ultimate destination in the liver lobule. The distinction as to the channel of infection is, therefore, more apparent than real. As to the histopathology, the differences are marked. In the monolobular type the periphery of the lobule is undergoing fibrous degeneration resulting in a more or less complete ring of fibrous tissue. In the mixed type an eccentric destruction of cells alternating with a compensatory hyperplasia of liver cells and connective tissue results eventually in the picture of irregular masses of liver cells imbedded in more or less dense connective tissue. This "mixed type" of Thomson, Rolleston, etc., is according to Lavenson and Milne really an advanced stage of the simple monolobular type of the disease in which the more complete destruction of liver cells has caused extensive repair with compensatory hyperplasia of regenerated cells and scar tissue formation, both results conspiring to distort the normal outlines of the lobule.

The pancreas is usually normal, though in some reports it is described as cirrhotic. But since the pancreas of the new-born shows normally under the microscope a relatively large amount of fibrous tissue in its capsule, it is easy to mistake a normal pancreas for a fibrous one. We believe that few cases of congenital occlusion live long enough for antemortem diagnosis of this condition to be made unless they possess a pancreas with an independent opening into the intestine. Hess(14) has reported a case with an accessory pancreas. Indeed, we may be normally certain that in infants suffering from this condition who have lived a month or more, the pancreas through a persisting duct of Santorini is pouring its secretion into the duodenum, especially as the stools show little or no free fat. Moreover,

a large number of autopsy protocols call attention to the patency of a pancreatic duct opening into the intestine directly.

The spleen is always enlarged, though sometimes not palpable in the living subject because of the preponderance of liver tissue. A fibrosis akin to that seen in the liver is reported by Emmanuel(21) and confirmed by several other case reports. According to Rolleston's hypothesis, the spleen enlarges primarily as a result of the infectious process in the liver. However, we are familiar with the picture of fibrous tissue formation in other pathological conditions accompanied by venous stasis and as venous stasis is an important factor in this particular variety of splenic enlargement, it would be against the rule not to have a fibrosis proportionate in degree to the permanent enlargement of the organ.

The mesenteric glands are always enlarged and frequently bile-stained, due no doubt to the excess of bile in the engorged lymph channels of the liver. There is practically no evidence of any peritoneal inflammation, either acute or chronic, about the bile ducts. Syphilitic evidences are, to again quote Milne, "conspicuously wanting." "In 23 out of 89 suspected cases" he says, "syphilis was positively excluded. Of the remaining 66, in only 10 cases of these was there reported some manifestation of syphilis, or else syphilitic parents. "As we have seen, the type of cirrhosis produced by syphilis is the characteristic interlobular type, quite easily differentiated from the monolobular or mixed type of cirrhosis characteristic of congenital obliteration. Case reports of closure of the bile ducts by congenital syphilitic inflammations have been made by Rolleston, Chiari, Beck, Housemann and others, while the cases cited as congenital occlusion by Simmoni, Hutinel, Hudelo and Lomar, are claimed by Milne to belong to the syphilitic hepatitis group(5).

Differential Diagnosis.—A jaundice of the new-born which persists beyond the usual period may excite a suspicion of bile duct occlusion, but the stools in the latter condition very quickly become acholic. *Catarrhal* jaundice in the new-born is of such rare occurrence as to be practically unknown. Syphilitic occlusion may be differentiated by the blood examination, but occlusion from this disease does not produce jaundice so quickly, nor does it always occur in syphilitic hepatitis. In infectious jaundice occurring in septicemia, the temperature and high leukocyte count will differentiate especially the latter. Family jaundice, described by Rolleston, Pfannenstiel, and others, which sometimes occurs in both mother and child and is usually fatal to the latter, does not produce acholic feces. The

liver in this condition shows few structural changes. Practically nothing is known about the etiology of family jaundice. The rare cases of hemolytic jaundice are practically impossible to differentiate from congenital occlusion in their clinical aspects. The use of the duodenal catheter as employed in the cases of Hess(14) and Koplik(22) to determine the absence of bile from the duodenum should help in the diagnosis. Of postmortem findings the histopathology of the liver is the most helpful in distinguishing congenital jaundice from other forms.

Metabolism Studies.—The studies of fat metabolism, digestion and nitrogen balance in this condition are of special interest.

The studies of the digestion in the small intestine in the absence of bile are also suggestive. Niemann(5) made extensive analyses in the case of congenital absence of the bile ducts occurring in a child that lived to be nine months of age. In this case a nitrogen absorption was noted of 80 to 93 per cent., and a fat absorption of 28 to 39 per cent. On very low diet more fat was found to be excreted than was given to the child. In the ten weeks' old baby studied by Koplik and Crohn(22), which in spite of the fact that no autopsy was performed we may be reasonably certain was a case of congenital occlusion, both nitrogen absorption and retention were approximately normal. Fat absorption was seriously interfered with, however, only 48.4 per cent. being absorbed. Saponification and fat splitting seemed also to be diminished. In the writer's case, however, very little free fat was discoverable in the stool but fat soaps were in excess. According to Meyer(27), Rubner and Heubner(25), and Freund(26) the fat absorption in normal infants varies from 88 to 96 per cent. Keller's experiments showed a fat-splitting power in the normal child of about 90 per cent. Koplik and Crohn using the Hess method of duodenal catheterization(24) made some valuable studies on the pancreatic action in this condition. They concluded "(1) that the pancreatic ferments are present, and therefore that the pancreatic ducts are patent; (2) that the amylase and trypsin are strongly present; (3) that the lipase is very weak. This latter fact," they say, "is the important fact, and is probably best explained by the absence of the normally present bile salts which act to increase the strength of the lipolytic ferment from 10 to 20 times."

As there can be no surgical relief for this condition the treatment must perforce be purely palliative, and almost entirely a question of feeding. A milk modification low in fats and rich in carbohydrates and proteid will put the least burden on the digestive organs, and is logically indicated. Whether or not the administration of bile salts

by mouth will improve fat absorption has not been proven, though it is likely that the resulting stimulation of bile production would offset any beneficial action.

SUMMARY.

Congenital occlusion of the bile ducts is probably of more frequent occurrence than has been supposed, as the increase of the number of cases is greatest where routine autopsies are done. It is not unlikely that some of the cases of persistent jaundice, improperly supposed to be simple jaundice of the new-born, resulting in death during the first few weeks of infant life are due to this condition. Practically all of the protocols of cases with a duration of life of two months or over, show the development of an outlet from the pancreas, independent of the common duct, a necessary condition to intestinal digestion.

The use of the urobilinogen test and the Hess duodenal catheter will be undoubted aids in the diagnosis.

The burden of evidence favors the view that this is a purely developmental and not an inflammatory condition.

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TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY.

(Continued from page 365.)

A METHOD OF PREPARING SYNTHETIC MILK FOR STUDIES OF INFANT METABOLISM.

DR. HENRY I. BOWDITCH AND DR. ALFRED W. BOSWORTH, Boston.
—"In connection with our investigations concerning infant feeding it became necessary for us to control all factors entering into the composition of the food used and as only liquid food can be used it soon became evident that a synthetic food from pure materials offered the only solution of the problem. After many experiments during the past few years we have finally perfected the method herein to be described, and have used milk prepared according to this formula for several investigations with success. The method consists of the following four steps: 1. The preparation of isolated food material for use in making synthetic milk. 2. The recombining of these materials to give a mixture of the desired composition. 3. The emulsification or homogenization of the fat and any of the solid or insoluble constituents entering into the composition of the food. 4. Pasteurization or sterilization of the food after it has been made. The following substances may be used as the case demands, distilled water, pure fat, pure sugar, pure protein, pure salts of various kinds, and the protein-free milk of Osborne and Mendel. Thus far they had used only olive oil and butter fat. The olive oil used was the purest commercial oil we could obtain, but the butter fat had been a pure product prepared by us according to the method of Osborne and Mendel. In some cases we have used the sugars of the purest commercial grade while in others we have used recrystallized lactose. So far we have used only one protein, casein, and have made use of this substance in three forms, calcium caseinate of commerce, the sodium caseinate of commerce, and pure casein, prepared according to the method already published by us. The salts should all be of the highest purity and the ones most likely to be used are the phosphates, chlorides, acetates, and citrate of calcium, magnesium, sodium and potassium. Osborne and Mendel have shown that a synthetic food made of pure materials contains no vitamins which seem to be essential to promote the growth of an animal receiving such food. These substances are present in a preparation made by them and called protein-free milk. In investigations involving the continued use of a synthetic milk for more than a few days it is

always wise to add some of this protein-free milk in order to get the benefit of the vitamins carried in it. All our synthetic milks have been made up on the percentage basis. The sugar is dissolved in one-half the volume of distilled water required for the complete mixture and the salts added to this sugar solution. The protein is dissolved or suspended in the other half of the water. If Larosen or nutrose are to be used they should be rubbed to a fine paste with a small portion of the water, the remainder of the water carefully added and then the whole gently warmed in warm water to effect complete solution. If pure casein or paracasein are used they may be suspended in the water and homogenized with the fat or they may be dissolved by the addition of an alkali, one-half of a cubic centimeter of normal alkali or its equivalent being used for each gram of protein. If strict percentages are to be observed the volume of water used must be diminished by an amount equal to the volume of alkali solution used to dissolve the protein. The two and one-half volumes are now united, the fat melted, and added and the whole homogenized. The successful use of these synthetic milks depends to a very great extent upon our ability to produce a homogenous mixture of considerable permanency and this result has been obtained by the use of the Manton-Gaulin homogenizing machine. This is a small one of special design built for laboratory use. Before use the machine is thoroughly cleansed and a solution of hydrogen peroxide run through the apparatus for fifteen minutes and the last traces of this removed by the use of hot recently boiled distilled water. Mixtures containing liquid fats may be homogenized at once without warming, though more satisfactory results will be obtained by slightly warming them. Mixtures containing semisolid fats must be heated to a temperature of a few degrees above melting-point of the fat used. All the fat is allowed to enter the machine first with a small portion of the liquid. The fat and this liquid are allowed to run through the homogenizing chamber once or twice at a pressure of 50 kilograms per square centimeter. The pressure is then increased to 150 kilograms and the whole mixture run through the machine after which the pressure is increased to 200 to 250 kilograms and the mixture run through once or twice more. In appearance the mixture now strongly resembles milk. The synthesized milk is then transferred to glass fruit jars and sterilized, lightening jars with glass tops being the best. The water reaching to about two-thirds the height of the jars is allowed to boil gently for about thirty minutes. If the food is to be kept for any number of days it should be heated again, and then stored in a cold place."

A STUDY OF THE TOPOGRAPHY OF THE PULMONARY LOBES AND FISSURES WITH SPECIAL REFERENCE TO THORACENTESIS.

DR. J. C. GITTINGS, DR. GEORGE FETTEROLF, AND DR. A. GRAEME MITCHELL, Philadelphia.—"In conclusion it may be said that the fissures of the lung in infancy show practically the same relation to the bony framework of the chest as in adults. The origin, course, and termination of the fissures varies greatly in different individuals.

The variations apparently do not depend upon any of the anatomic characteristics of the chest and cannot be predicted therefore. The lower level of the lungs in infants does not extend quite as low as in adults. For this reason, and owing to the anatomic characteristics of the bases of the pleural cavities in early life, great care should be exercised to avoid damage to the diaphragm in performing thoracentesis. It would seem that the lowest point for tapping with absolute safety, therefore, would be the fifth or possibly the sixth interspace in the midaxillary line, and the seventh and possibly the eighth interspace in the line of the angle of the scapula. In the author's clinical experience it might be said that the seventh or eighth interspace in the postaxillary line, which lies nearer to the scapula than to the midline, is the optimum point of attack."

REPORT OF COMMITTEE ON VAGINITIS.

This committee consisting of Dr. J. C. Giddings, Dr. Samuel McC. Hamill, Dr. C. A. Fife and Dr. Howard C. Carpenter of Philadelphia presented their report through Dr. Giddings. He stated that they had been appointed to investigate the subject of vaginitis in infants and young girls and had conducted a very thorough investigation. A questionnaire had been sent to various institutions caring for female children and to a large number of pediatricians. The replies to this questionnaire Dr. Giddings analyzed. With these replies as a basis the committee had formulated the following set of resolutions for the consideration of the Society:

1. That the American Pediatric Society address a letter to Health Officers of States and Cities containing the following recommendations:

(A) That cities be required to provide adequate hospital and dispensary facilities for the care and treatment of children having vaginitis.

(C) That matrons be placed in charge of the girls' toilet rooms in public schools.

(D) That toilet seats embodying the principle of the U-shape be used in all schools and that the toilets be of proper height for different ages.

(E) That city and state laboratories be empowered and equipped to make bacteriological examinations for physicians when patients cannot afford to pay a private laboratory fee.

(F) That educational literature on the subject of vaginitis be prepared and distributed to mothers through the medium of physicians, hospitals, dispensaries, health centers, municipal and visiting nurses.

(H) That asylums for children and day nurseries be licensed, and that the license be not granted unless: first, the institution has adequate facilities for the recognition of gonococcus vaginitis; and second, that the institution exclude children having this disease if they cannot be properly isolated.

2. That the American Pediatric Society address a special letter to hospitals which care for children containing the following recommendations:

(A) That separate wards be maintained for the treatment of children with vaginitis who are also suffering from other diseases.

(B) That microscopic examinations of smears be made before admission to the general wards of the hospital. In securing material for the smears extreme care should be taken to observe rigid aseptic precautions.

(C) That observation wards be provided.

(D) That individual syringes, bed-pans, catheters, clinical thermometers, thermometer lubricant, wash basins, soap, powder, wash cloths and towels be provided.

(E) That single service diapers be used (at least for girls); or, that diapers be sterilized in an autoclave at 15 pounds pressure for five minutes.

(F) That nurses be required to make daily inspection of the vulva of each at the time of bathing, and to report immediately the presence of the slightest suggestion of a vaginal discharge.

(G) That low toilets be provided and equipped with seats embodying the principle of the U-shape.

(H) That for routine purposes, the spray be used in place of tub baths for the bathing of young girls, and that older girls be sponged in bed.

(I) That nurses receive special instruction as to the nature of vaginitis, the ease with which it is transmitted, the methods of preventing its spread and the necessity for rigid aseptic surgical technique in its handling and treatment.

(J) That a dispensary with special facilities for the treatment of gonococcus vaginitis be provided.

(K) That nursing care and supervision be given in the home.

(L) That mothers be instructed as to the dangers of vaginitis, the manner in which it is transmitted, the best method of protecting other children and the necessity of prolonged observation.

(M) That all cases of vaginitis under observation be voluntarily reported to the local Health Officer in states or cities where no legal requirements are in force.

Dr. B. K. RACHFORD of Cincinnati said: "I have had considerable experience in the treatment of vulvovaginitis and in the hospital with which I am connected they have had a ward divided into four compartments for the treatment of this form of infection. The patients are admitted to the first compartment and passed through the other three compartments as they progress. When they are discharged from the fourth compartment they are turned over into the hands of the children's clinic where they are kept under continuous observation. There are many things that will have to be taken into consideration before vulvovaginitis can be made a reportable disease. The first thing that will have to be done is to make an effort to change the attitude of the public. At the present time the very mention of vulvovaginitis strikes terror to people and carries with it a stigma of disgrace. This attitude should be changed and the public made to understand that vulvovaginitis in children is a different disease from what it is in the adults. Nothing in the way

of reporting these cases can be accomplished so long as the term 'gonorrheal' is used."

PROVOCATIVE AND PROPHYLACTIC VACCINATION IN THE VAGINITIS OF INFANTS.

DR. ALFRED F. HESS, New York.—"We have had to contend with the problem of vaginitis in the institution with which I am connected and have profited in some directions by experience, and this experience may be of service to others who are actively interested in this problem. Our efforts have been directed in various directions; in preventing the admission of infected infants; in attempting in many different ways to avoid spread of infection; in diagnosing the cases at the earliest possible moment, and finally in resorting to every means to effect a cure. Vaginitis presents an entirely different problem in a home or asylum from what it does in a hospital for infants. In the latter the solution is comparatively easy and simple, for all that is necessary in order to eradicate the disease is to cease admitting female infants and to discharge the infected cases, one by one, as they are cured of the ailment for which they were admitted to the hospital. In an asylum, on the other hand, when a case of vaginitis slips by the admitting physician or arises apparently *de novo* in one of its wards, it is realized that a heavy burden has fallen upon the medical staff, for it is probable that this infant will remain for years a threatening source of infection and will have to be guarded under quarantine. The diagnosis of gonococcus vaginitis is not always easy to establish. There is no doubt that vaginitis may be due to organisms other than the gonococcus. There is a class of border-line cases which is exceedingly puzzling, showing merely pus cells on microscopic examination. If these cells are numerous an inflammation is undoubtedly present, and in the great majority of cases the infecting organism will be the gonococcus. The specific nature of this infection is all the more probable if there are no organisms to be seen in the field among the cells. One exception should be borne in mind as regards the diagnostic significance of pus cells. This was called to our attention by noting these cells in an infant only forty-eight hours old who was brought to the institution for admission. It hardly seemed that this was a case of gonococcus vaginitis, so we investigated to ascertain how often pus cells were encountered in smears taken from infants during the first two days of life. These tests were carried out by Dr. Edwin Langrock and showed that in half the cases, pus cells might be found in smears taken within the first forty-eight hours, so that they must not be regarded as pathological, but as the probable reaction of the external tissues to the inevitable invasion of bacteria. As we probed deeper we find that the fundamental cause of vaginitis must be considered to be the latent carrier, some healthy infant who harbored the gonococcus. Such has been our experience. Whenever a case of vaginitis rose in the institution the rule was that examination should be carried out three times during the following

week in every infant in the ward in order to ferret out the source of the infection. Almost every instance of this kind brought to light some case where, in spite of the absence of discharge, gonococci were evident in the smears. Such recrudescence of infection came about every few months and sometimes oftener. During the past five years autopsies had been performed in four infants who had vaginitis while in the institution. They all showed the same pathological condition: Macroscopically the vagina appeared negative, as did the body of the uterus and the appendages. The only abnormal condition was redness of the tip of the cervix, which did not extend along the canal to the internal os. Microscopic examination confirmed the gross appearance of these structures. In every instance the entire vagina, the uterus, and tubes were carefully examined and the sole lesion was this inflammation of the cervix. From these postmortem examinations it would seem that we must regard the average gonococcus infection as involving the cervix rather than the vagina, and as a cervicitis rather than a vaginitis. The degree of vaginitis found in children who applied for admission to the institution was almost 50 per cent. and gave grounds for believing that vaginitis was not a disease particularly associated with child-caring institutions. In order to overcome the danger of the latent carrier we have for the past year administered three injections of gonococcus vaccine soon after the children were admitted to the institution. These infants had all shown the absence of pus cells upon admission. The vaccine was made from a culture obtained from one of the cases in the institution and 250,500, and 750 millions were given with three-day intervals. The object of these vaccinations was to see whether they would prove provocative and would bring to light a latent infection. The dosage which was used was entirely empirical. As a result it would seem that it could probably be much smaller. At the present time we are giving, 100, 200 and 400 millions. Moreover, two infections might be sufficient, and we rarely have brought about a discharge by a third inoculation. During the past year these provocative inoculations have led to the discovery of eight new cases during the first week or two following their admission to the institution. As a result of this procedure not one new case has slipped into the main institution from the admitting pavilion. We have also made use of this diagnostic aid in the wards where from time to time cases of vaginitis arose. We are unable to state the exact scientific basis of the reaction following these inoculations. It was, however, not due to the rise in temperature, and could not be regarded as absolutely specific, for a reaction was obtained at times by similar injections of staphylococcus vaccine, although this was not found to be as reliable for this purpose as that made from the gonococcus. The vaccine was found to be of value not only as a diagnostic measure but to a certain extent for prophylaxis. To this end it was used in about 100 infants and we were able to change the entire nature of the vaginitis in our institution. In cases that were vaccinated the vaginitis showed a mild type of infection. It was not to be expected that prophylactic vaccinations could prevent the

occurrence of carriers. However, the protected cases instead of developing a vaginal discharge full of pus cells and gonococci, were found to have no discharge whatever, and showed as the only evidence of infection a few pus cells and microorganisms in the cervical smears. In other words, a nonclinical type of the disease resulted. There are some diseases which occasion not only recrudescence of vaginitis but seemed to confer an added susceptibility. This seemed especially true of scarlet fever. In those diseases the susceptibility extends still further, so that joint infection and other evidences of a bacteremia result. There is not only an acquired susceptibility to gonococcus infection but also a natural susceptibility and a well-defined natural immunity. This immunity is rare and in many instances not absolute."

DISCUSSION.

DR. F. B. TALBOT, Boston.—"I would like to ask whether after they made these injections there was a discharge produced by the provocative inoculation and how long such a discharge existed, and also whether it was accompanied by any unusual symptoms."

DR. J. P. SEDGEWICK, Minneapolis.—"We had an instance in which a child in a private hospital developed a vaginitis. We were in doubt as to whether to discharge the child and so had the discharge examined. This proved to be a case of pure proteus infection. It was interesting to know that one could get this kind of an infection."

DR. ALFRED F. HESS, in reply to Dr. Talbot's question, said: "The presence of a discharge was very variable; sometimes it was present for a very short time, about two weeks. These cases were not all due to the gonococcus; we have had cases that were not gonococcus infections. I hope this question will be taken up by others and that they will test out these provocative inoculations for themselves."

EARLY SYMPTOMS OF PROTEIN SENSITIZATION IN INFANCY.

DR. B. RAYMOND HOOBLER of Detroit said: "I have experimented with subcutaneous, intravenous and intraperitoneal injections of a foreign protein in guinea-pigs. These experiments have given a great deal of information which should be translated from the laboratory to practical use. Dr. Talbot has pointed out the relation between egg protein and asthma, and Dr. Schloss has shown the relation between foreign protein and eczema, and Schloss-Waring, the relation of anaphylaxis to gastroenteric disturbances. Guinea-pigs sensitized to a foreign protein showed symptoms varying from the mildest to the most severe. The first effect of the sensitization was shown in peripheral irritation, the pigs being restless and scratching themselves. The second stage of anaphylaxis was a partial paralysis and muscular incoordination. The pigs rarely died in this stage. Following this there was sometimes a convulsive stage and the pig died during or just after a convulsion. When this stage was not reached recovery was usually rapid. Comparing these symptoms

with those seen in the human being it was found that there was a close analogy. The first symptoms in the human being as in the guinea-pigs manifested itself in peripheral irritation, as by a rash, either urticarial or erythematous. This was followed by apprehension, collapse, vomiting, great muscular weakness and, in rare instances, by speedy death. In some subjects the symptoms might be similar but much milder in form. The severity of the symptoms depended on the amount of foreign protein injected. There was also frequently a family predisposition to some form of sensitization in the father, the mother, or a brother or sister. The substances which caused anaphylaxis were usually, egg, milk, oatmeal, fish, etc. In the human being the first lesions on the skin might be urticarial, or erythematous, or only a single wheal which might be mistaken for an insect bite, or there might be a rash, miliary in type, thought to be due to the irritation of the clothing, the chapping of the skin, or one of those rashes formerly classified as intestinal rashes. There might also be vasomotor disturbances referable to the respiratory tract, as sneezing, snuffling, etc. Or, again, there might be a dry cough and yet in neither of these would the child show any pathological lesion. This corresponded to one of the early symptoms in the guinea-pig that might be seen to pull and scratch his nose. There might also be wheezing which might precede the asthmatic attack by months. Asthmatic attacks were often very persistent and then again disappeared as suddenly as they had come. There were also often acute digestive disturbances and nervous symptoms, as irritability, fretfulness and sleeplessness, somewhat akin to the symptoms seen in the animal. All of these symptoms might come and go with great rapidity. Fortunately all these symptoms did not occur in the same child. Certain nutritional disorders might be due to the biological character of the food. Many of the symptoms mentioned as having been observed in anaphylaxis were also symptoms of other diseases, but when one had the group of symptoms outlined and they recurred from time to time, if taken together they would be very suggestive of anaphylaxis and this condition should be taken into consideration, since it was very important that it be recognized early."

DR. OSCAR M. SCHLOSS of New York said: "I believe that if we grant the existence of an acute explosive type of anaphylaxis it is only reasonable to believe that there may be a milder type which differs from the acute type only by reason of the fact that the symptoms are more mild. The difficulty lay in obtaining definite proof that many of the milder disturbances were due to food protein as there was no definite evidence that such was the case. They had made tests but the results were inconclusive. They had also tried to sensitize passively a number of such children. The question of heredity was of interest. In the cases which I have reported there was in the vast majority of instances evidence that one of the parents or some other member of the family showed an allied condition. There were also instances in which an infant showed anaphylaxis the first time it got a food containing a foreign protein different from

that it had been receiving. With reference to the question of asthma, I have investigated a number of cases of bronchial asthma and on the whole the result have been very disappointing. They have not excluded the possibility that many cases might be due to food substances, but no definite proof has been forthcoming that they were due to such food substances, so the only thing to do at present is to leave the question open. I have seen four cases, three due to egg and one to milk in which the usual treatment of desensitization gave good results."

DR. F. B. TALBOT of Boston said: "In the discussion of this subject it should be remembered that the condition of anaphylaxis is relatively rare. In looking over our hospital records I have found relatively few cases of asthma but a great many skin cases that might have been due to anaphylactic action. In regard to what Dr. Hoobler has said, the symptoms he has described were interesting but it seems to me that Dr. Hoobler was scarcely justified in all of his conclusions. For myself, I have been unable to find any connection between a mild erythema and anaphylaxis; in cases of urticaria I believe all are due to some form of anaphylaxis; the miliary rashes I have been unable to connect with any form of anaphylaxis; rough skin in some instances might be due to anaphylaxis, it seems to have such a connection in one case that came under his observation. He had had one case of anaphylaxis cured by reducing the fat in the food. Some of his cases had given definite skin reactions but they did not all get well when one took out of the food that substance which gave the skin rest. The respiratory symptoms described in the paper might be due to common cold. The snuffles should be put down to adenoids. The wheezing was not due to anaphylaxis but was suggestive of the typical rôles of bronchitis. The symptoms of croup were not in the majority of cases of anaphylactic origin, but in a few instances they might have this origin. I have had such a case in which the taking of a raw or soft-boiled egg brought on an attack of croup. On the other hand, the symptoms of croup described by the parent may be laryngeal diphtheria. Some digestive symptoms are of anaphylactic origin, but I think this is one of the last things in the question of anaphylaxis that we will prove. Some of my patients have, of their own accord, given as symptoms of this condition that the protein to which they were sensitized 'stays in the throat' or it gives a 'shivering sensation.'"

CALCIUM METABOLISM IN A CASE OF HEMOPHILIA.

DRS. D. M. COWIE AND C. H. LAWS, Ann Arbor.—"This case of hemophilia gave a family history of bleeding in three sisters. The average coagulation time of the blood was two hours. Calcium lactate was administered in large doses and during this time the coagulation time decreased to two hours, but as soon as the administration of the calcium lactate was discontinued the coagulation time returned to about two and one-half hours. During the administration of the calcium lactate the calcium content of the blood

gradually increased from 1.665 per 1000 c.c. of blood to 1.745 per 1000 c.c. of blood, but as soon as the administration of the calcium was discontinued the calcium content of the blood returned to its normal condition."

DR. ALFRED F. HESS said: "As far as I know this is the second case in which the calcium metabolism was studied in hemophilia. Of the cases which I reported some time ago one was a normal child and one was encephalic. The normal child showed much the same things as the case just reported. There was an increased calcium content of the blood and a hastened coagulation time while calcium was being administered by the mouth. When calcium was added to the blood of this patient *in vitro* there was also decreased coagulation time. In cases of hemophilia examination should also be made of the blood platelets as these may be found to be abnormal in this condition."

DR. DAVID M. COWIE.—"The blood platelets were normal in this case. No examination was made as to the effect of the calcium *in vitro*. We have been particularly interested in working on the blood in getting a method by which we could handle the blood more easily and have succeeded in finding a method by which we can get a perfectly clear liquid like water and an organized clot within fifteen or twenty minutes."

THE CALCIUM CONTENT OF THE BLOOD IN RACHITIS AND TETANY.

DRS. JOHN HOWLAND AND W. MCKIM MARRIOTT, Baltimore.—"The changes in the bones that are incident to rickets and the various theories as to its causation are familiar to all of you. Most of the theories as to the causation of rickets are more or less unsatisfactory. Thus far there has been no study made to determine definitely whether there is sufficient calcium present in the blood of rachitic patients or not. We have devised a method which enables one to find the amount of calcium in the blood, using only $\frac{1}{2}$ cm. of blood serum. We have studied eleven cases of rickets and have determined the calcium content of the blood in a number of control cases. We find that in the majority of cases the calcium varies between 10 and 11 mg. per 100 c.c. of blood serum. In rachitis we found in some instances a reduction of calcium, but never less than 9 mg. per 100 c.c. of blood serum; very often it was between 10 and 11 so that it can be said that rachitis does not depend upon an insufficient amount of calcium in the blood.

"The calcium content of the blood seems to have a definite relation to the onset of tetany. If tetany is dependent on a reduction of the calcium content of the blood, it may be that some severe symptoms, such as muscular spasms, may be controlled by calcium in large doses. The determination of the calcium in the blood of infants with tetany was made in seven instances with very accurate technic. All showed a very marked reduction in the amount of calcium. The calcium content instead of being 10 or 11 mg. per 100 c.c. of blood serum varied in these cases between 6 and 7 mg. An analysis was made in the case of two children with no active

symptoms of tetany but who showed the characteristic electric reaction; in one of these there was a moderate reduction of calcium while in the other there was no reduction in the calcium. When the child lost the evidences of tetany the calcium content of the blood returned to normal. We found that children, like dogs, developed tetany after thyroidectomy, that convulsions in dogs and children presented practically the same appearance, and that the calcium content of the blood serum was usually the same, between 5 and 7 mg. per 100 c.c. of serum. It seemed apparent therefore that parathyroidectomy exerted a distinct effect on the calcium content of the blood."

DR. DAVID COWIE, Ann Arbor.—"I would like to ask whether Dr. Howland had made all his determinations on the blood serum. We have made the determinations on the whole blood and I would like to point out that the blood platelets absorb a certain amount of calcium. It is interesting to see the differences in the observations on the serum and on the whole blood. With reference to the calcium reduction in tetany there seem to be two classes of cases, some in which there is a reduction of the calcium and some in which the calcium content is not disturbed, or but slightly lower. The calcium content in normal individuals varies a great deal and much work will have to be done to determine the normal calcium content of the blood."

DR. J. P. SEDGEWICK, Minneapolis.—"We too have found that there was an increase in the calcium content of the blood following a high intake of calcium in the food, and I can support Dr. Laws' observations. One could now give a definite reason for the lowering of the electric reaction by the administration of 5 grains of calcium chloride a day. The calcium has an immediate effect on the electric reaction. I employed calcium chloride because it contains twice as much calcium as calcium lactate. One also gets a marked result in spasmophilia from the use of calcium."

DR. L. EMMETT HOLT, of New York said: "The findings of Dr. Howland in these cases of tetany are very well borne out by the effects of the use of magnesium sulphate in hypodermic injections. Giving calcium by mouth is very uncertain in its results, but after giving magnesium sulphate there is evidence that some very definite result had been produced. One may give a hypodermic of from 5 to 20 grains of Epsom salts to an infant of four months, or from 15 to 30 grains to one of twelve months of age, and the results will be manifested within twenty minutes. The anhydrous salt is twice as strong as the magnesium sulphate, and in prescribing one should always specify whether he wishes the anhydrous salt or magnesium sulphate."

DR. MCKIM MARRIOTT, Baltimore.—"It is preferable to determine the calcium content in the blood serum rather than in the whole blood. We have perfected our method so that it can be applied to $\frac{1}{2}$ cm. of blood serum. It is perfectly true that the clot contains a small amount of calcium, but the calcium content of the serum is extremely constant."

EARLY MORNING TOXIC VOMITING IN CHILDREN.

DR. THOMAS S. SOUTHWORTH, New York.—“The purpose of this communication is to direct attention briefly to the vomiting of children, which not infrequently occurs in the early morning either before or soon after the first feeding. This vomiting is often of toxic origin as indicated by the fact that the vomitus after the long night period contains no food residue, if it occurs before the first morning feeding; if after this feeding only food from this meal. It is sharply distinguished from the vomiting of undigested and fermenting food in cases in which there is failure of gastric digestion which is immediately responsible for the emesis. This latter type of vomiting is more prone to occur later in the day after the stomach had been taxed by one or more feedings. When the chemistry of the intestinal tract goes wrong, either slowly and cumulatively, as doubtless usually obtains in recurrent vomiting, or more abruptly with the fermentative or putrefactive processes set up by the aid of bacterial agencies, absorption of some of the products into the circulation is certain. Fermentative processes, owing to the irritation caused, are more likely to set up a conservative diarrhea in an effort at elimination. With free drainage of the intestinal tract, there is, without doubt, excretion through the mucosa of the intestine which serves to some extent to offset the absorption. But with an actual or a relative constipation, and consequently lowered elimination, the positive balance of absorption gained the upper hand. The effect of milder degrees is familiar in the dulness, depression of spirits, headache, lack of appetite, coated tongue, and even some feeling of nausea, in both adults and children. If not too habitual this syndrome is promptly relieved by free catharsis. The toxemia of recurrent vomiting is probably of gradual and cumulative evolution, coming to a head with the development of marked or relative constipation, or precipitated by some unusual factor as fatigue, nervous strain, the onset of one of the infectious diseases, or the taking of an anesthetic. Here elimination was slow and vomiting prolonged. Fever is not a constant symptom. With a more active and fulminating toxic absorption, such as we may assume occurs with an acute putrefactive process in the intestine, fever is a usual accompaniment, often rising sharply, and if a conservative diarrhea is not quickly established the gastric mucosa participates in the effort at elimination. In the early morning vomiting it seems hardly probable that gastric stasis, which so often accompanied acute indigestion or the onset of febrile conditions, could be overcome in the final hours of the night, and the stomach be completely emptied of all vestiges of food before the early morning vomiting occurred. It is much more plausible to assume that in the early morning type the disturbance of digestion had been primarily intestinal, not gastric. There is an attempt at elimination of absorbed toxic principles by the gastric mucosa, and that these accumulate during sleep when all the reflex sensations are more or less deadened by slumber and assert their presence on awakening in nausea and vomiting. Reaccumula-

tion in the stomach of sufficient quantities to cause a recurrence of such vomiting is comparatively rare during the waking hours. At all events after the stomach has been emptied by one or two acts of emesis at short intervals, the vomiting has not the persistent character of the true recurrent type. This may be readily due to the difference in nature of the toxic products in the two conditions, their quantity in the circulation, or their rate of excretion. So common is it for children to vomit in the morning, if they vomit at all during the course of minor illnesses, and not toward night, and so frequently will milk, if given at the first feeding, be ejected in large masses, that it has come to be my habit, where in the presence of fever I suspect toxemia, to order for the first morning feeding broth or broth and barley gruel. By thus avoiding the formation of acid coagula I feel that I have often averted the tendency. Dilution of the stomach contents or the demulcent action of the barley when added may play some part in this result. A further characteristic of both toxic types of vomiting, as distinguished from that of acute gastric indigestion is the quicker recovery of the digestive functions of the stomach. In the toxic type the stomach functions are only slightly impaired, and as soon as the elimination has been accomplished by free catharsis, and vomiting has ceased, simple food will be received and digested. Appetite also returns more promptly. The extreme caution in resuming feeding after such an attack is unnecessary; these children should be fed simply as soon as the vomiting ceases. This form of vomiting does not seem to have received special attention and these observations are presented with a view to inviting discussion."

DR. T. DEWITT SHERMAN, Buffalo.—"I would like to ask Dr. Southworth if he has had any gastric analyses made in any of these cases, and whether any of these cases showed a hyperchlorhydria, and also whether there might be a neurotic element. It would also be interesting to know whether he had tested for acetone in the urine early in the morning. I have had quite a number of similar cases and invariably found acetone in the urine."

DR. ISAAC ABT, Chicago, said: "The vomiting may be the effect of something outside the gastric tract. The chronic alcoholic vomits because of a nasal pharyngitis. It seems that in several of the cases that Dr. Southworth referred to with gastrointestinal symptoms the vomiting might be explained as possibly induced by a pharyngitis."

DR. THOMAS S. SOUTHWORTH, New York, said: "I have not made the gastric analyses to which Dr. Sherman has referred. It is extremely probable that some of these children might have had hyperchlorhydria. In some of them there was a definite odor of acetone but I did not make an examination of the urine. As to what Dr. Abt has said, if he had seen these cases he would not question that they were other than as I have stated in the paper. A child coughs a great deal from the presence of mucus in the pharynx but the type of cases to which I referred did not cough, so

that this could not have been the cause of the early morning vomiting."

A STUDY OF THE ETIOLOGY OF CHOREA.

DR. JOHN LOVETT MORSE AND DR. CLEAVELAND FLOYD, Boston.—
"This study was undertaken primarily to determine, if possible, the parts which syphilis and bacterial infection play in the etiology of chorea. It seems from a study of the literature that there is very little evidence in favor of the syphilitic origin of chorea and much against it. In our investigations there was nothing whatever in the history of twenty-one or 81 per cent. of our twenty-six cases to suggest syphilis. In the others there was a history of miscarriages. No one of the patients was born prematurely. The blood of three of the five children in whose families there was a history of miscarriage gave a negative Wassermann test. The spinal fluid was not tested in these three children. The blood of one gave a positive Wassermann reaction and of the other a doubtful reaction on three occasions, while the spinal fluid was negative at one examination. None of the children showed any of the stigmata of syphilis. In only three of these cases was there anything in the family history even suggesting syphilis. Of the twenty-five children in this series twenty-one or 84 per cent. gave a positive skin reaction to tuberculin. It would be absurd to assume that tuberculosis was the cause of chorea in these twenty-one children. The conclusion is therefore justifiable that syphilis seldom, if ever, plays an active part in the etiology of chorea. The close clinical relationship between acute articular rheumatism, endocarditis and chorea, taken in connection with the present conception that acute articular rheumatism and acute endocarditis are bacterial in origin, has suggested that chorea is also bacterial in origin, and perhaps caused by the same or a similar organism. Our cases confirm the general belief as to the frequency of the association of chorea with rheumatism and endocarditis; seven, or 37 per cent. of them having had rheumatism in the past or in connection with the chorea. Six of them had acute endocarditis, and six chronic valvular lesions, a total of twelve, or 46 per cent. The tonsils were normal in but eleven cases, while they were diseased in eleven or 42 per cent., and had been removed on account of disease in four others. The teeth were normal in but seven cases; pyorrhea was present in two of these children and definite pus pockets were found in three others when the teeth were extracted. Certain investigators have found organisms in the blood during life and from a review of the literature on this subject it seems that the results thus far obtained from blood cultures are inconsistent and inconclusive. In almost every case in which organisms have been found there has been some other complicating condition amply sufficient to account for the presence of organisms in the blood. The absence of organisms in the blood does not prove, however, that chorea is not caused by bacteria, because, although the cause of the disease, they may have been absent from the blood at the time the cultures were made, and the methods of cultivation used might not have been suitable

for the growth of the organisms, if present. There are practically no data as to the bacteriology of the cerebrospinal fluid in chorea during life. During the past year we have made a study of twenty-six cases of chorea in the acute stage of the disease with a view to determining the presence of an infecting agent in the blood stream and cerebrospinal fluid, the frequency with which it could be obtained, and its cultural characteristics. About 5 c.c. of cerebrospinal fluid and 5 c.c. of blood were secured where it was possible. Various media and aerobic and anaerobic methods were used. In every instance the cultures as well as the smears from the cerebrospinal fluid were negative. Blood cultures were negative in twenty-one instances, even after several weeks of incubation and subculturing. In five cases organisms were found. In one case a small bacillus, diphtheroid in type appeared. This was a Gram-negative organism and was not pathogenic for rabbits even when large doses were given intravenously. Diplococci were found in one case, but no organisms were cultivated. In both of these instances the tonsils were enlarged and the teeth carious. In two other cases short chains of cocci appeared but all efforts at subculturing failed. In these two cases the tonsils were normal but the teeth carious. In another case positive blood serum cultures were obtained after ten days of incubation. This patient had acute endocarditis and had had several attacks of rheumatism. The organisms in this case were Gram-positive streptococcus. This organism was now readily subcultured and its characteristics had remained unchanged through ten generations. Intravenous inoculations into rabbits killed the animals in twenty-four to forty-eight hours. Autopsies showed a general septicemia and cultures from the heart's blood and knee-joints gave a good growth of streptococci. Four other rabbits were given intravenous inoculations, and all showed lameness and difficulty in walking and standing, and restlessness on handling of the joints. Some swelling of the knees was also noted. The fact that the streptococcus obtained from the fifth case caused lesions in the endocardium and joints of rabbits made it very probable that it was the cause of the endocarditis in the child. The fact that it caused lesions in the brain and meninges of the rabbits similar to those found in the brain and meninges of fatal cases of chorea suggested that it was also the cause of the chorea in the child. Further than this it was not safe to go. The absence of microorganisms in the cerebrospinal fluid was an argument against the bacterial origin of chorea, because it would be reasonable to suppose that in a disease in which the lesions were located in the nervous system, the causative organism would be more constantly present and more abundant in the cerebrospinal fluid than in the blood. However, the absence of organisms in these cases might be explained by the fact that most of them were mild or only moderately severe in type. It might also be possible that the failure to detect the organisms more often in the blood or spinal fluid might have been due to the fact that they were only temporarily present in the blood stream and tended to locate themselves in the meninges, endocardium, or joints. While there is

much that points to a microörganism or a group of organisms as the cause of chorea the bacterial origin of chorea is not yet proven."

DISCUSSION.

DR. HENRY KOPLIK of New York said: "I agree with Dr. Morse's conclusions with reference to syphilis and chorea. I have made a number of blood examinations in cases of chorea and in all cases so far have had negative results, and I, therefore, feel that I can endorse Dr. Morse's conclusions. The streptococcus may possibly have been the cause of the chorea in the case of chorea and endocarditis to which Dr. Morse has alluded in his paper. I have had a number of cases of chorea in which endocarditis came in secondarily. It seems that our methods of blood culture must be still further improved, and then, again, it may be that the bacteria have disappeared at a certain period and have left a toxin."

DR. ISAAC ABT, Chicago.—"I have gone over my hospital records and collected 226 cases of chorea, and they show a history of rheumatism, infection, or a febrile condition, very infrequently. Over eighty of these patients had chorea for a long time without any other condition. It certainly is not true that all said to have chorea have an infectious chorea."

DR. L. E. LAFETRA of New York said: "At Bellevue Hospital several cultures were made from the blood of choreic patients and the streptococcus viridins was recovered. The technic employed cannot be very exact for in the same laboratory and with the same blood some obtained microörganisms and some did not."

DR. ABRAHAM JACOBI of New York said: "I do not doubt that Dr. Morse's paper contains a great deal about the therapeutics in chorea for I take it for granted that all look to therapeutics as the end of their studies. I have nothing to say with reference to the connection between rheumatism, endocarditis and chorea that had not been heard over forty years ago, but I wish to call attention to a paper which will be printed in the *Journal of the American Medical Association* in which Dr. A. L. Goodman, attending physician to the German Hospital in New York, tells of a method by which he cures chorea in a few days. This method is that of taking a sufficient quantity of blood from a choreic child, say 30 or 40 c.c., taking the serum from this blood, amounting to less than one-half this quantity, and then injecting that serum into the same child. This treatment is a very remarkable one and at first I did not wish to accept it, but the cases improved within twenty-four hours and still more within forty-eight hours. I think I should make this communication so that you can employ this method for it is of priceless value."

THE EFFECT OF SUBCUTANEOUS INJECTIONS OF MAGNESIUM SULPHATE IN CHOREA.

DR. HENRY HEIMAN, New York.—"Though chorea has been known for centuries the results of treatment have been disappointing.

Stimulated by the work of Meltzer, who used magnesium sulphate in the treatment of tetanus with gratifying results, we tried a similar method in five successive cases of chorea. We used a sterile solution of 25 per cent. magnesium sulphate, giving three injections daily for fifteen days. There are certain objections to this method of treatment: (a) the possibility of inflammatory reaction; (b) young children may become unduly excited by the treatment itself; (c) the danger of breaking the needle in the tissues; (d) albuminuria. From my experience with these cases the conclusion seems justifiable that the subcutaneous injections of magnesium sulphate, though only employed in five cases, did not produce sufficient improvement to justify further trial."

THE PROGNOSIS AND TREATMENT OF BANTI'S DISEASE IN CHILDREN.

DR. EDWIN E. GRAHAM, Philadelphia.—"Splenic anemia is essentially a chronic disease which usually lasts for about five years, during which time the symptoms are mild; after this period for two or three years they steadily become worse, until finally the syndrome of Banti's disease develops, and the case rapidly progresses to a fatal termination. Cases have been reported which persisted for ten to twenty years, but the juvenile type of this disease tends to run a more acute course than the adult form. If not treated or if treated only medicinally, splenic anemia is almost invariably fatal. Under surgical treatment the prognosis is rather more favorable than otherwise, the outlook depending upon the duration of the disease at the time the spleen is removed. If done early, splenectomy is attended by slight mortality, and in uncomplicated cases a cure may be expected; but when the disease is complicated by other affections of chronic infectious nature, the value of the operation is questionable. Splenectomy is even more advantageous in children than in adults. After the removal of the spleen in most cases the blood picture more or less approaches normal, but in a few cases it may vary greatly, so that five years may elapse before the differential count becomes normal. When Banti's syndrome is well established the prognosis is most unfavorable even though splenectomy be performed, for the vital organs have become the seat of degenerative changes and the liver is cirrhotic. Until the year 1908, the mortality following splenectomy for splenic anemia was 17 per cent. from 1908 to 1912, forty-seven splenectomies were performed with five deaths, this mortality being a little above 10 per cent. But these figures were based on cases in which the symptom-complex of Banti's disease was not present. In splenic anemia there is evidently an infectious or toxic process going on in the spleen which causes fibrotic enlargement and the formation of splenic hemolysis. Therefore in these cases the removal of the spleen has ample justification, even though it is still a mooted question whether the favorable results of splenectomy are due to regeneration of corpuscles or to decreased hemolysis. If an abundance of iron is supplied to the system after the removal of the spleen which is the organ in which iron metabolism takes place, polycythemia will result in many cases, and an increase

in red cells is always noted at varying intervals after operation; therefore in splenic anemia iron is undoubtedly indicated both theoretically and practically. It is also believed that the cirrhotic changes, which in Banti's disease takes place in the liver, are due to toxins produced by the spleen; this explains the favorable influence of splenectomy on the liver. Splenectomy is both useless and dangerous in cases in which the hemoglobin is below 30 per cent., and the red blood cells are below 2,000,000. The operation should, as a rule, be attempted only when there is no edema, no parenchymatous nephritis, no serious degenerative change in the liver, and while the patient is still able to go about. In severe cases blood transfusion if done shortly before the splenectomy seems to increase the ability of the child to withstand the shock of the operation. The operation of choice in Banti's disease is Talma's operation. In 25 per cent. of the cases of splenectomy for Banti's disease there is afterward pain in the long bones, this being probably due to hyperplasia of the red bone marrow. Hemorrhages from the stomach and intestines are most likely to occur for the first two weeks after operation and must be treated by complete rest for the upper abdomen, by injections of saline or of blood serum, or by direct transfusion."

The case reported in detail occurred in a child of seven years. She was the ninth child and none of the others showed any similar tendency, the family history being absolutely negative. The child gave a history of nose bleeds dating back five years and more recently of subcutaneous hemorrhages. Physical examination revealed a presystolic murmur at the mitral area with a sharp second sound. The pulmonic sound was accentuated and the heart was displaced upward. The splenic outline was visible on the right side. Splenic dulness began at the fifth interspace in the midaxillary line, beginning about two fingers above the xiphoid and curving out to the right, until at the level of the umbilicus it was approximately 3 inches from the spot and filled almost the entire abdomen. The detailed blood count is presented and shows briefly hemoglobin markedly reduced, red cells usually not below 3,000,000, slight poikilocytosis, and the presence of normoblasts. There was an actual leukopenia.

DISCUSSION.

DR. HENRY KOPLIK, New York.—"I have had under my observation a case which was unquestionably one of Banti's disease. This subject showed marked symptoms as a child but operation was refused. He has now grown to manhood, is an engineer, and apparently healthy although his spleen and liver are enlarged. He is now living a useful life; this might not have been the case had we operated upon him."

THE ENERGY METABOLISM OF A CRETIN.

DR. FRITZ B. TALBOT, Boston.—"This subject was a typical cretin, three years and eight months of age, and was studied in the

respiratory chamber devised by Benedict in the laboratory of the Carnegie Institute at Washington. They found his basal metabolism per kilo body weight was $40\frac{1}{2}$ calories, per square meter body surface 808 calories per twenty-four hours (Lissauer). In the absence of normal data in children of the same age this metabolism was compared with that of a normal eight months baby and a normal ten months baby. It was found that the metabolism of the cretin was decidedly lower than that of the two normal babies. Unfortunately, results after treatment with thyroid have not been sufficiently accurate to use. These results were consistent with those of Magnus Levy and the more recent work of Dubois in Lusk's Laboratory. The practical application of these findings is that the cretin requires less food than children with sufficient thyroid activity and that after treatment with thyroid extract would require more food than before treatment."

FAMILIAL ICTERUS OF THE NEW-BORN.

DR. ISAAC A. ABT, Chicago.—"This disease has nothing in common with Buhl's or Winckel's disease. There was no evidence to prove that it is due to a septic process. It is not present at birth; it occurs during the first few days of life. In none of the cases reported is there a history of birth injury; it does not seem to be due to the toxemia of pregnancy. One might say that the children were in a sense defective and became very soon incapacitated to carry on extrauterine life. The disease occurs in successive pregnancies, occasionally several normal children are born and then several die in a few days after birth as the result of grave and progressive icterus. As a rule there is no hereditary influence. The disease usually begins on the first or second day of life and rapidly increases in severity. The symptoms are described briefly by Pfannenstiel as a catarrhal condition of the mucous membrane, sometimes with bloody discharge; the stools are catarrhal and frequent; the urine contains bile pigment, and the patient shows meningeal irritation. At the onset there may be hyperemia of the skin. If the disease continues hemorrhages from the various mucous surfaces into the skin and from the umbilicus occur and death soon follows from collapse. The disease bears no relation to syphilis and has nothing in common with family jaundice. Isolated cases have been reported from time to time in the literature, but the writer has encountered examples of familial icterus in the new-born in two families. The first case occurred in an Italian family, the father and mother both being twenty-eight years of age, and having lived in this country ten years. There seemed to be nothing in the history of the parents or grandparents that was in any way connected with the condition in this infant. The mother had borne five children, of whom two were living and three dead. The two eldest children had always been well. The third baby seemed strong and robust at birth, developed jaundice on the second day, and died on the third day. The history of the fourth child was similar, and the course of the fifth does not differ materially from these.

"The second case occurred in a Russian family. In this instance the mother, six years ago, had had an operation and the gall-bladder was removed. Two or three months after the gall-bladder operation she had had her tonsils removed. She is about thirty-two years of age and the father three years her senior. She has borne six children. The first child has chronic nephritis and is eleven years of age. The second child is living and well. The third pregnancy resulted in miscarriage. The fourth child became jaundiced on the second day, was seized by convulsions, had frequent stools, became more intensely jaundiced, and died on the third day. The fifth child, whom the writer had the privilege of observing gave a similar history. An autopsy was performed and showed some enlargement of the liver and spleen, though no pathological changes of any moment could be noted and bacteriological examinations showed the tissues to be sterile. The bile passages were of normal size and showed no obstruction. A sixth child became icteric on the second day, was very somnolent and toxic, but showed no hemorrhages. The condition of the child seemed grave. On the fifth day a slight improvement was noted and from this time the jaundice had gradually disappeared and the baby was now over a year old and unusually bright and happy."

DISCUSSION.

DR. WILDER TILESTON, New Haven.—"I would like to call attention to an interesting feature of these cases and that is the yellow icterus staining of the base of the brain which is never seen in jaundice, and which might be correlated with the nervous symptoms in icterus. I would like to ask Dr. Abt whether there was any fragility of the red cells in his cases. The red cells have been tested in chronic family jaundice and have shown a fragility."

DR. T. DEWITT SHERMAN, Buffalo.—"It has occurred to me that it might be possible that jaundice and the allied conditions in infants might be due to the chloroform administered to the mother during labor. It is well known that chloroform produced hyaline and fatty degeneration and that its effects are concentrated on the liver and kidney. It might be well to take up this matter and see how much chloroform these mothers of icteric babies have had during labor; it may be that they have received a great deal and that it has had a deleterious effect on the infants."

OBSERVATIONS ON MEASLES.

DR. CHARLES HERRMAN, New York.—"The deaths reported as due to measles give an inadequate idea of the real number caused by this disease. A large number die from a complicating bronchopneumonia, especially between the ages of one and two years. This is suggested by the parallelism between the curve of morbidity from measles and the curve of mortality from bronchopneumonia between one and two years. In a series of 300 secondary cases of measles observed by me, the fever appeared on the tenth or eleventh day from

the time of infection in 56 per cent.; catarrhal manifestations on the eleventh or twelfth day in 60 per cent.; the tonsillar spots on the ninth to the thirteenth day; the Koplik spots on the eleventh or twelfth in 54 per cent.; and the eruption on the twelfth to the fourteenth day in 67 per cent. The catarrh was present in 7.2 per cent. on or before the tenth day, the Koplik spots in 12.8, and the tonsillar spots in 34 per cent. In 4 per cent. of the cases in which the tonsillar spots were present, they were seen as early as the seventh day, and in a few cases the tonsillar spots were present in the patients who did not show any Koplik spots. The presence of the tonsillar spots will be found valuable in schools, hospitals and asylums in detecting and isolating the patients early. Infants under two months of age are absolutely immune. This immunity gradually becomes less marked so that at eight months it has entirely disappeared. This gradual disappearance is shown by the longer period of incubation. In sixty-three children under eight months of age the eruption appeared in only 42.5 per cent. on or before the fourteenth day, whereas in 81.4 per cent. of those over eight months the eruption appeared at that time. In infants between five and eight months the disease was usually milder. This was also shown by the fact that only 41 per cent. of these lost weight, whereas of those between eight months and two years 76 per cent. showed such a loss. The immunity is probably conveyed through the placental circulation; only those infants whose mothers have had the disease seemed to enjoy it. Infants between three and five months who have been in intimate contact with measles and do not contract it, sometimes are not infected when exposed later in life."

THE BACTERIOLOGY OF THE URINE IN HEALTHY CHILDREN AND THOSE SUFFERING FROM EXTRAURINARY INFECTION.

DR. HENRY F. HELMHOLTZ, Chicago.—"A few facts with regard to pyelocystitis in infancy and childhood have been pretty well established, namely, that the infection is very much more common in girls than in boys, that the infecting organisms is most frequently the bacillus coli, and that the symptomatology of the condition is so indefinite as to make a diagnosis practically entirely dependent on the examination of the urine. Regarding the mode of infection there is considerable difference of opinion. The main facts in favor of the urethral route are the predominance of the cases in girls, the shortness of the urethra, and the fact that the orifice of the urethra is constantly contaminated with colon bacilli. The question as to the mode of infection is, however, far from being settled. In order to get an idea of the field involved it seemed essential first of all to determine the bacteriology of the normal urine and urethra and with this object the bacteriological findings of catheterized specimens of urine taken from thirty infants and from thirty-one girls over two years of age are recorded. The catheterized specimens were obtained by a very careful technic and collected in three sterile tubes so as to determine the difference between the first and last urine

passed. In the course of a few experiments tubes one and two were found to be practically identical so that in the majority of cultures taken only one and three were used. No. 1 was inoculated in a deep dextrose agar tube and on litmus lactose plate. No. II was grown on a litmus lactose plate, a blood agar plate and in deep blood agar tubes. The tabulated results showed that of twelve normal cases five had sterile urine. Of five specimens that were not sterile, three showed one organism per cubic centimeter and two three organisms per cubic centimeter; two had organisms in the first portion of the urine but none in the last.

In summarizing the results of these examinations it was found that in 119 specimens of carefully catheterized urine from sixty-one different individuals, sixty-one were sterile, and fifty-eight contained bacteria. Of those from twenty-four normal infants, thirteen were sterile and eleven contained bacteria. In the specimens from girls over two years of age, thirty-five were sterile and twenty-seven contained organisms. The number of bacteria found in the first series was considerably larger than in the second series. This might be explained by the fact that in the older children one could cleanse the urethral orifice much easier than in the infant and introduce the catheter directly into the urethra. The bacterial flora was practically the same in both series, Gram-positive staphylococci and pseudodiphtheria organisms predominating; the former were present in practically every case in which any organisms were found. In no instance were Gram-negative bacilli found in such numbers in both specimens that it seemed probable that it was more than a contamination from the urethra. In conclusion it might be assumed on the evidence given that organisms of the colon group are not normal inhabitants of the female urethra and that in extraordinary infections occurring in the first two years of life the colon bacilli are frequently found in the urethra, that was in about one-third of the cases. In girls over two years of age the urine is almost free from organisms and entirely free from bacilli of the colon group."

OXYCEPHALY: ITS OCCURRENCE IN TWO BROTHERS.

DR. W. W. BUTTERWORTH, New Orleans.—"A review of the literature on this subject shows that the classical symptoms of this condition are exophthalmos, pain, and some disturbance of vision. An interesting feature in these two cases was the family history showing similar symptoms in the grandfather. It is very rare to find two brothers in the same family showing this condition and a history of a similar condition in a grandparent. These boys were not mentally deficient. The cranial picture was suggestive of the condition. The cause of this deformity had been variously attributed to early closure and ossification of the sutures, fetal rickets and hydrocephalus in early life."

Dr. Butterworth gave a lantern-slide demonstration showing the bones of the skull in this condition. There was a peculiar mottling of the inner plate of the cranium. The x-ray of the long bones and

joints showed that these were not normal. There was an enlargement of the condyles of the large bones and some enlargement of the bones of the face. The condition is rather rare.

MENINGITIS IN THE NEW-BORN AND IN INFANTS UNDER THREE MONTHS OF AGE.

DR. HENRY KOPLIK, New York.—“Meningitis in the new-born occurs sometimes secondary to general sepsis and sometimes as a primary infection. The symptomatology in the primary condition is very obscure. The child’s head may be bruised during labor and one cannot come to a conclusion as to the actual condition until the swelling has subsided. The signs applicable to older children are not applicable to these young babies. In these there is no rigidity, no bulging, no Babinski and the child is in a condition of muscle clonus anyway. It is no wonder that a diagnosis is not made more frequently. I concluded that I would try to find some characteristic symptoms of meningitis in babies. I found that convulsions might be simple or the child might only have slight twitchings. If there was a convulsion this might be repeated or it might not be. I observed one case in which there was only one convulsion but there was very high fever, 105° F. or over and there were remissions and then it might subside, and again it might not, if the disease was still in progress. Often the temperature might last for a week or ten days and then would come to a lower level and would run along at 100° F. or slightly above. The bulging of the fontanel was not present; indeed, in some cases there seemed to be a depression. Macewen’s sign was very difficult to determine in very young babies. Some gave signs of fluid in the head and some did not. Sometimes after a very stormy labor, it was only later in the disease, after a week or ten days, that there was fluctuation and an increase in the quantity of fluid, noticed not only by the bulging but by the tympanic sign over the temple. Sometimes after a high forceps delivery the child might have a slight amount of blood in the urine and in such a child it was very difficult to decide whether one had simply a slight hemorrhage or a meningitis. In some instances no one knows what is the matter until the babies are two or three months of age. Most of the hospital’s cases must have had the condition longer than the mothers suspected. The results of lumbar puncture in these cases was very interesting. The lumbar in a series of twelve cases showed the presence of the streptococcus four times, the pneumococcus three times, the meningococcus three times. One case showed very distinctly that the meningitis was secondary to an arthritis. In the secondary cases I found a streptococcus in the blood. One case observed from the start began with a pyelitis and this got into the circulation and a coli meningitis was developed as a secondary infection. The fate of these babies was disheartening for they all were fatal sooner or later. One case of meningitis in this series still lived but in this case there was a marked hydrocephalus. All of these cases were treated by lumbar puncture, but

young babies do not bear lumbar puncture well. As to how these babies get a meningococcus infection, it seems that the mode of infection may possibly be explained when we consider the methods of resuscitation, mouth to mouth suction, and introduction of the fingers into the child's mouth, with the trauma that may be incident to this procedure. If the person who performs these manipulations is a meningitis carrier it is easy to see how infection may occur.

THE USE OF SALT SOLUTION BY THE BOWEL (MURPHY METHOD) IN INFANTS AND CHILDREN.

DR. EDWIN E. GRAHAM.—“The Murphy method of injecting saline solution by slow proctoclysis has been used for a few years past in adults suffering from many other conditions than peritonitis, and by medical practitioners as well as surgeons. My experience with it in certain conditions in infants and children has led me to believe that it is of much more value to the pediatricist than most of us are aware of. It has been most successfully employed in the highly toxic states of typhoid fever, and pneumonia and appears to afford great relief, but in the later stages, after the heart has been affected by the toxemia, it must be used with great caution, when there is obstruction in the lungs and the blood pressure has become high. In the acute infectious diseases toxemia may be greatly influenced by the employment of the Murphy drip and in diphtheria and scarlet fever the resulting dilutions of the toxins is of the utmost importance and value in averting nephritic conditions. In uremia and suppression of urine, slow proctoclysis promotes diuresis and thus dilutes the highly toxic and irritating materials which would otherwise be harmful to the kidneys. Generally speaking in toxemia from any cause, whether it be autointoxication, mineral poisoning, and septicemia, the judicious use of the salt solution by the bowel will prove of great value in treatment. If nephritis with edema is present the administration of salt solution by this method is unwise, although in a few such cases it has apparently been employed with success. I have been greatly impressed by the results of the employment of the Murphy drip in profuse diarrhea due to intestinal infection and in the summer diarrheas. In giving the proctoclysis there must be a low pressure and a good return. There should be a 12-inch drop and the catheter should be introduced 4 or 5 inches into the bowel. The temperature of the water should be kept at 110° F. This treatment might be given over periods of from ten days to two weeks provided periods of rest were given at intervals. In measuring the sodium chloride, to say one teaspoonful to a pint is very inaccurate; the preparation of the solution is important and should be made with extreme accuracy.”

MULTIPLE SCLEROSIS IN A CHILD FOUR AND ONE-HALF YEARS.

DR. GEORGE N. ACKER AND DR. JOSEPH S. WALL, Washington.—This patient was a colored child, four and one-half years of age, who

visited the Out-patient Department of the Children's Hospital, March 2, 1916, complaining of "nervousness." The family and personal history revealed nothing of moment. The present trouble came on slowly. The mother did not notice it until her attention was called to it by friends. The child had grown progressively worse until at the present time she was greatly troubled with shaking of the body and limbs, inability to sit still or walk and total incapacity for feeding herself. The chief symptoms presented at the first examination were, nystagmus, shaking of the body, exaggeration of all reflexes, rapidity, but not enlargement of the heart. Ten days later these symptoms seemed to have grown worse. A week later she was admitted to the house service of the hospital. At this time her mental faculties seemed dulled, but she would answer simple questions requiring only two or three words. Her speech was thick with the so-called scanning speech (bradylalia) and markedly staccato. While lying in bed she is perfectly quiescent, but on any attempt to sit up the coarse muscular tremor, involving the muscles of the neck, arms, and trunk and to a lesser extent the legs, manifests itself. There is a vertical oscillation of the head as well as lateral rotatory movements. She stands and walks only when partly supported by the nurse. The drinking test gives rise to a typical volitional tremor. The tongue shows marked tremor when protruded. There is marked elbow jerk, wrist jerk, and heightened epigastric reflexes. The patellar jerks are greatly exaggerated. An ankle clonus is present in both extremities. The heat and cold sense are apparently normal except over the right thigh where there is some dissociation of the senses.

There is incontinence of urine and occasionally of feces. The urine is normal except for the presence of a few white cells. This case was presented because of the infrequent occurrence of multiple sclerosis in children. We are of the opinion that the case falls under the category of disseminated sclerosis. It measures up by the signs and symptoms with the syndrome of sclerosis. It gives evidence of rather widespread involvement of the nervous system with resulting impairment of function, rather than a focal lesion, or collection of lesions, with much actual destruction of nerve elements, for there are no paralyses.

THE DANGER TO HOSPITAL EFFICIENCY FROM DIPHTHERIA CARRIERS.

DR. SAMUEL S. ADAMS AND DR. FRANK LEECH, Washington. — There are many factors which enter into hospital efficiency. There must be team work between the highest in authority and the most humble employees. To obtain hospital efficiency the following may be considered requisite: 1. The President of the Board of Directors of all hospitals should be chosen with a view to his personal interest in all things connected with the institution. He should be a man well-trained in the handling of men and affairs. 2. The Executive Committee should be a body composed of those members of the directors who are in close touch with the interests of the institution

from every viewpoint. A representative of the medical staff should always be present at their meetings to express the views of that body, with the idea of keeping harmony with all in authority.

3. Every hospital should have a trained medical superintendent, who should have exclusive control of all matters connected with the hospital.
4. A superintendent of nurses who had shown exceptional ability in her work as a teacher and director of young women should be chosen.
5. The members of the medical staff should be medical men, who have been promoted from dispensary work, or who, by reason of their attainments elsewhere, have shown particular aptitude for the positions to which they are appointed.
6. Hospital internes should be chosen by competitive examination and have every opportunity to do work under the direction of the medical superintendent and the medical officers on duty.
7. Nurses should be chosen from applicants who have had sufficient preliminary education to assure their ability to grasp not only ward work but also the lectures which they are compelled to attend.
8. Employees should be under the control of the superintendent and amenable to control and discipline by him. Social workers should be provided for follow-up work, not only for the hospital but for the out-patient department.
10. Efficiency experts should be engaged from time to time to check up the work and criticise the same, from the president of the Board of Directors to the orderly.

If these suggestions were perfectly carried out it would be easy to look after the other details of hospital efficiency. Hospital efficiency resolves itself into doing everything for the comfort and cure of the patient. The occurrence of two cases of diphtheria in our hospital led to a culture of every individual in the house, as a result of which fifty-one positive cultures were found out of a total of 100 including all employees, nurses and internes. Only one case had shown any clinical evidence of diphtheria. The hospital wards were closed for three weeks to the reception of new patients. At present we have reduced the number of positive cultures to seventeen. A search for the source of the infection seemed to point to a nurse in the baby ward who had suffered from a sore throat. Eight positive cultures were found among twelve babies, seven nurses gave positive cultures. She had mingled freely with other nurses throughout the hospital, and we were forced to the conclusion that she was the beginning of the trouble. To prevent the occurrence of such outbreaks we are convinced that all institutions for the care of sick children should be provided with a suitable detention ward for the detention of all new admissions. We feel that new cases should, immediately on admission, have nose and throat cultures taken and be at once placed in the detention ward for five days. All the ward cases which show the slightest symptoms of the minor contagions should immediately be placed in the detention ward and carefully watched for a proper period, and if definite symptoms of any contagion appears they should at once be transferred to the contagious disease institution. If it is impossible for financial reasons to provide a detention building, cubicles should be provided in each ward and proper nursing technic

carried out to prevent the dissemination of minor contagions. Nurses, internes, or employees showing any evidence of illness should be seen at once by medical officers. Visitors to ward patients should be restricted to adults only, and such visitors admitted as infrequently as possible. Following the suggestion of Dr. Alfred F. Hess, all infants should be kept isolated from children of the run-about age. Tests for the virulence of diphtheria carriers should be made thus relieving ourselves at once of a large number of cases which it would be otherwise necessary to isolate.

THE SCHICK REACTION IN INFANTS.

DR. HENRY L. K. SHAW AND DR. WILLIAM E. YOULAND, JR.—There is no question of the accuracy of this test in detecting individual susceptibility and immunity to diphtheria. Clinical evidence shows that young infants, especially in the first six months of life, possess natural immunity and that the susceptibility to diphtheria increases rapidly after the first year to the eighth year and then decreases. The results of the Schick test in children over two years of age show a striking similarity with the clinical frequency of the disease, but the statistics of cases under two years of age are meager in comparison and not at all uniform. A review of the results of the observations of various investigators in cases under one year of age shows a variation of from zero to 40 per cent., and from one to two years of age the variation ranges from 15 to 65 per cent.

We have made an investigation among ninety-five infants under two years of age in two infants' institutions and hospitals in Albany. In making the tests we used the standard diphtheria toxin diluted so that 1 c.c. contained one-fifth the M.I.D. and 0.1 c.c. of this dilution was used in making the tests. The procedure of Park and Zingher of heating one-half of the diluted toxin at 70° C. for three minutes was used for the purpose of control. The reactions were read daily for four days and the final interpretation made on the fourth day. In practically no case did a typical pseudoreaction occur. In some cases the reaction does not appear until the third day although it appears more frequently on the second day.

Our results in the different institutions were remarkably constant. In sixty-six children under one year of age we found 47 per cent. positive, while in twenty-nine children between one and two years of age 58.6 per cent. were positive. These results are remarkably similar to those reported by Park and Zingher. We had one case in which a negative Schick reaction was negative who two days later, developed diphtheria as demonstrated by cultures. From our experience with this group of cases it would seem that when virulent diphtheria bacilli are found in infants having no antitoxin in their tissues a careful examination for diphtheritic rhinitis should be made, as we have had five cases in which it was entirely overlooked clinically.

There is no question but that every child, nurse, or attendant entering a children's hospital or institution, or coming in contact

with the children in any way, should have cultures taken from both nose and throat and a Schick test made as a matter of precaution against the disease.

AMERICAN PEDIATRIC SOCIETY.

Election of Officers.—The following officers were elected to serve during the ensuing year: President, Dr. F. S. Churchill of Chicago; Vice-president, Dr. Wilder Tileston of New Haven, Conn.; Secretary, Dr. Samuel S. Adams of Washington, D. C.; Treasurer, Dr. Charles Hunter Dunn of Boston; Recorder and Editor, Dr. L. E. LaFetra of New York; Assistant Editor, Dr. O. M. Schloss of New York.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Active Immunization with Diphtheria Toxin-antitoxin and with Toxin-antitoxin Combined with Diphtheria Bacilli.—Referring to their earlier publication, W. H. Park and A. Zingher (*Jour. A. M. A.*, 1915, lxx, 2216) say that while the immediate results of attempts at active immunization with toxin-antitoxin were disappointing, they thought that later ones obtained by retesting the immunized individuals without further injections might give a much better showing. They therefore determined to follow up and retest, from four to eighteen months after discharge from the hospital, as many of the injected children as possible. They tabulate their results and conclude that individuals who, before treatment, give a negative Schick reaction are immune probably for life and, therefore, it is not necessary to inject them, when exposed, either with antitoxin or toxin-antitoxin.

Those who give a positive Schick reaction and are exposed to diphtheria and in immediate danger should receive either antitoxin alone or, if a longer protection is desired, both antitoxin and toxin-antitoxin.

For the general prophylaxis against diphtheria in schools and communities, excluding immediate contacts, a mixture of toxin-antitoxin alone (from 85 to 90 per cent. of the *L*+ dose of toxin to each unit of antitoxin) or toxin-antitoxin plus vaccine of killed diphtheria bacilli is recommended. The dose is 1 c.c. of toxin-antitoxin and 1,000,000,000 bacteria injected subcutaneously and repeated three times at intervals of six or seven days. Sufficient time has not as yet elapsed to judge the value of adding the injections of the bacilli to the toxin-antitoxin.

The early and the late results of active immunization should be determined with the Schick test. Early results are those obtained by the application of the test within four weeks, and late results from four months to two years after the immunizing injections.

Familial Syphilis.—P. C. Jeans (*Amer. Jour. Dis. Child.*, 1916, xi, 11) states that germ transmission of hereditary syphilis has not been proved, and it does not seem likely that it ever occurs.

It is highly probable that all the mothers of syphilitic children have been infected with syphilis. Of eighty-five mothers of syphilitic children 86 per cent. gave positive Wassermann reactions. All of the remaining cases but six gave a history of infection or treatment, or both. Five of these six patients were examined at least ten years after the birth of their last syphilitic children and the infection is probably dying out.

Eighty-seven per cent. of the mothers deny all knowledge of the infection. The mothers are for the most part infected during the latent stage of the father.

Of 331 pregnancies in 100 families, 30 per cent. were abortions, 9 per cent. stillbirths, 61 per cent. living births. Of the living births 24 per cent. had died. Of those living 80 per cent. had syphilis.

Of the total pregnancies 90 per cent. were presumably syphilitic and although 10 per cent. seem free from syphilis, there is no proof that they all are. The total syphilis in these families amounts to 93 per cent. of the entire family.

For the most part these families followed Kassowitz's rule; *i.e.*, decreasing grades of infection in the children.

In case of syphilitic mothers bearing nonsyphilitic children, it is probable that the infection in the mother is localized in places where it is not readily transmitted.

The idea that there are different strains of spirochetes receives some support from these families.

Transmission to the third generation, though not proved, is distinctly an occasional probability.

Intramuscular Injections of Whole Blood in Treatment of Purpura Hemorrhagica.—Reporting a case of purpura hemorrhagica in a boy of five and one-half years in which recovery rapidly followed intramuscular injection of whole human blood, H. W. Emsheimer (*Jour. A. M. A.*, 1916, lxvi, 20) says that the best methods of treatment of purpura hemorrhagica, in addition to the usual measures are: (a) subcutaneous or intravenous injection of human blood serum; (b) transfusion, and (c) intramuscular injection of whole fresh human blood.

The intramuscular injection of whole blood is a simple, harmless, effective procedure, and should be employed before other radical measures in all cases of severe purpura hemorrhagica; it may also have a wide field of usefulness in hemophilia and other blood diseases: in bleeding from various parts or organs of the body; in wasting diseases, and in many infections.

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ORIGINAL COMMUNICATIONS.

FETAL AND PLACENTAL SYPHILIS.*

(A Lantern Demonstration.)

BY

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(With nine illustrations.)

INTRODUCTION.—The importance of syphilis in obstetrical work is attested by the fact that this Society has chosen it as one of the subjects for discussion at this meeting. The disease is so prevalent and its manifestations so diverse that exact diagnosis is of paramount importance and every method which is of value should receive consideration. Since Wassermann demonstrated the possibilities of diagnosis by the complement-fixation phenomenon, there has been a tendency to neglect the other methods of study and base the diagnosis upon the serological findings alone. Fortunately, in obstetrics, we have available one and in some cases two other methods of laboratory investigation which are perfectly reliable and it is to these recently neglected possibilities that I would call your attention.

The fact that the placenta of a syphilitic child differs from the normal has long been recognized but the lesions which we now consider practically specific were first accurately described by Fraenkel in 1873. For many years these histopathological changes offered the only laboratory confirmation of the clinical findings unless, perchance, the child died and an autopsy was permitted. With

* Presented before the American Gynecological Society in Washington, D. C., May 9, 1916.

the discovery of the *Treponema pallidum* by Schaudinn and the development of the silver impregnation method of demonstrating these organisms in the tissues by Levaditi, an additional method of study was made possible.

Placental Syphilis.—Grossly the syphilitic placenta differs quite markedly from the normal. The most characteristic change is the increase in size and weight. Whereas the normal organ weighs only about one-sixth the weight of the child, the ratio in fetal syphilis is one-fourth to one-third. This increase in weight is due in part to cellular proliferation and in part to edema. The maternal



FIG. 1.—Normal villi teased out in water (low-power drawing).

surface has a rather peculiar grayish-pink, greasy appearance and the tissue is more friable than usual. A positive diagnosis can rarely be made from the gross appearance alone; but frequently the changes are marked enough to excite strong suspicion.

The more characteristic histopathological changes are dependent upon an obliterative endarteritis and endophlebitis which are direct manifestations of the syphilitic infection. These changes can frequently be demonstrated in the freshly delivered placenta merely by teasing small portions in water or normal salt solution and

examining under the low power of the microscope. In the normal organ the villi are delicate and there are numerous branches which are approximately the same caliber throughout their length. With the light largely cut off, the cellular structures can be distinguished and the widely separated stroma cells differentiated. By allowing

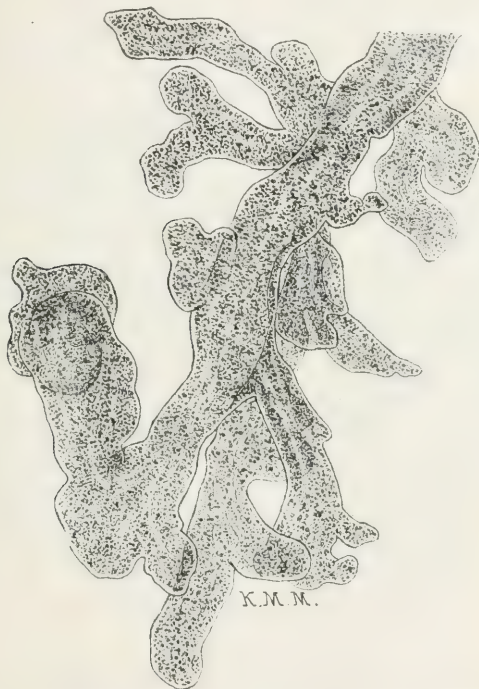


FIG. 2.—Syphilitic villi teased out in water (low-power drawing).—
(From Williams.)

somewhat more light to come through the diaphragm, the blood-vessels can be distinctly made out unless the teasing has washed out the blood, in which case they are visible only with difficulty. By clamping the cord immediately, the child is born, the vessels throughout the placenta remain markedly distended and by properly

regulating the light aperture they can be followed in their entire course. Fig. 1, which is a drawing of a villus thus prepared, shows the characteristics very graphically. In an endeavor to show the course of the blood, the arterial side of the system was made somewhat darker than the venous; but under the microscope no such differentiation is possible.

In the teased syphilitic placenta, Fig. 2, the terminal villi are of somewhat larger caliber and tend to be clubbed at the ends. In

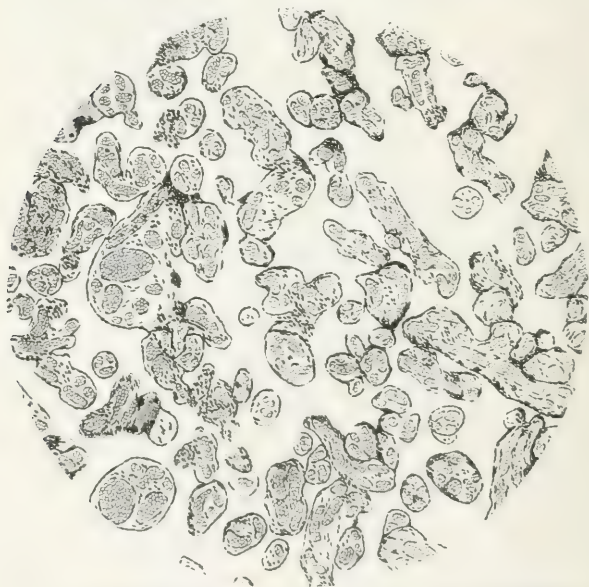


FIG. 3.—Normal villi—cross-section (low-power drawing).—(*From Williams.*)

some specimens this is much more marked than in the illustration and should always be viewed as suspicious. It is also to be noted that the stroma cells are more numerous and that the entire villus appears more cellular than normal. The blood-vessels are entirely absent in the terminal villi and in the smaller stems.

This method of diagnosis is crude when compared with the study of fixed and suitably stained sections but with practice it is possible

to obtain fairly close agreement. The only advantage of the method is that, since no preparation is necessary, a diagnosis can frequently be made immediately.

For the purpose of better histological study the placenta \ae are fixed in a 4 per cent. aqueous solution of formaldehyde (10 per cent. formalin), imbedded in celloidin or paraffin and cut in sections 10 to 15 μ thick. For routine work they are stained with hematoxylin and eosin and mounted in Canada balsam. The examination is made under the low power of the microscope.

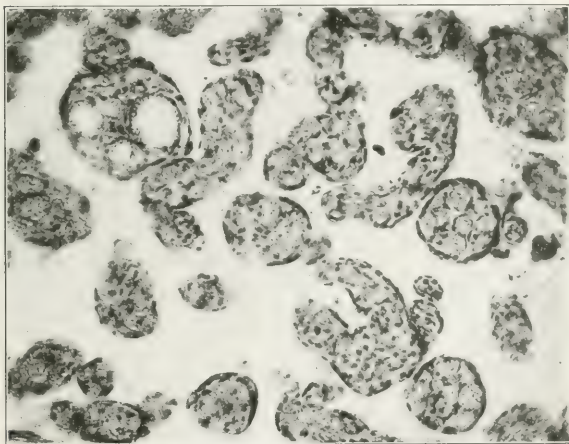


FIG. 4.—Normal villi—cross-section (high-power photomicrograph).

The normal placenta is pictured in Figs. 3 and 4. The former is a low-power drawing and indicates the usual appearance. It is to be noted that the villi are small and that the blood-vessels are very numerous, taking up about one-half of the total cross-section of each villus. The stroma cells are relatively few in number and there is a single layer of epithelial cells. The high-power photomicrograph, Fig. 4, merely accentuates the essential features already described.

The syphilitic placenta offers many points of difference. Fig. 5, a low-power drawing of such a placenta to the same scale as Fig. 3, well illustrates the characteristic differences in structure. The

villi are generally much larger and more closely packed together with a consequent diminution of the intervillous blood space. The stroma cells have undergone a rapid proliferation and are closely packed, while the epithelial cells retain their usual arrangement. The blood-vessels have almost entirely disappeared, small vessels

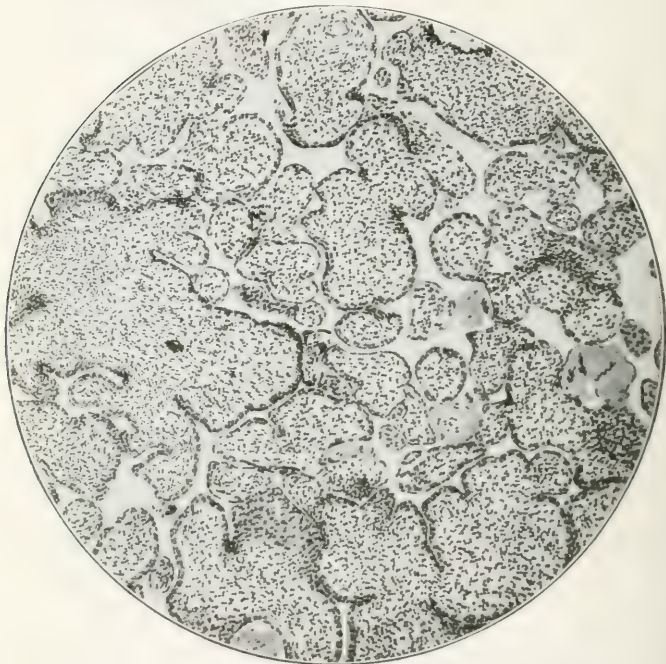


FIG. 5.—Syphilitic villi—cross-section (low-power drawing).—(From Williams.)

being present in only two of the larger villi. Fig. 6 is a high-power photomicrograph showing a similar picture.

While the differences between the normal and the syphilitic organs are usually as marked as shown here, there are cases where this is not so and there is a reasonable doubt as to the specificity of the changes encountered. The process does not uniformly affect the placenta at first and occasionally the villi from one stem may

show definite changes, while the neighboring villi are normal. For this reason it is desirable to use a fairly large section ($1\frac{1}{2} \times 1\frac{1}{2}$ cm.) for study and sometimes several sections from different portions of the placenta may be necessary. In such cases even when apparently typical changes are demonstrated in some particular area, one can merely say that the picture is suggestive of syphilis; a diagnosis being made only in the light of the other clinical and laboratory findings. Again, there may be all gradations in the severity of the pathological changes with a resultant picture

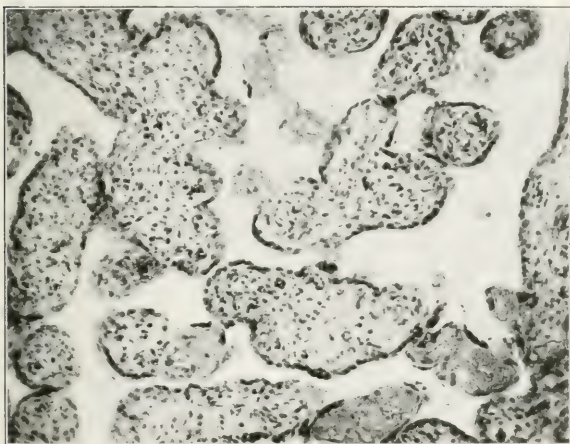


FIG. 6.—Syphilitic villi, cross-section (high-power photomicrograph).

somewhere between the normal and the definitely luetic and here a positive diagnosis is again impossible without other evidence. Among the seventy-five placentaë herewith reported the diagnosis was doubtful in only six or 8 per cent.

We believe that the changes named are specific if noted in the placenta during the last trimester of pregnancy; but before that time the usual picture of the developing organ may be very confusing. The normal early placenta presents a picture which may not be distinguishable from the advanced luetic organ. The villi are large and filled with rather loosely packed stroma cells. Blood-vessels are not visible because they have not yet grown down into the villi. Not infrequently, however, careful search will reveal

some epithelial cells of the Langhans' layer still remaining and thus make possible the diagnosis of an early placenta. In Fig. 7 such an early placenta is pictured and in the villus at the top the two epithelial layers can be distinctly seen. In the cases where this evidence of prematurity is not available, the history should be carefully considered and where the child is of less than seven lunar months development (35 cm. long) one should not attempt a positive diagnosis from the histological picture alone.

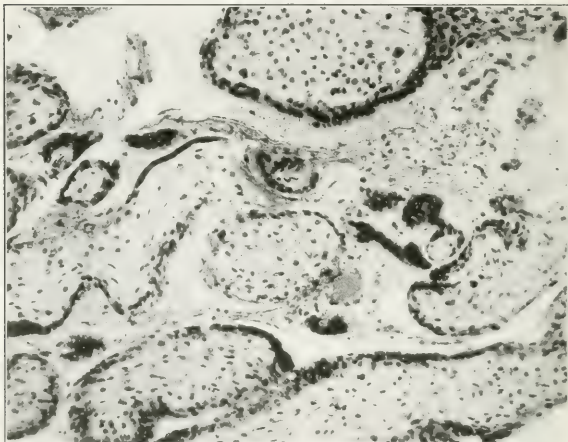


FIG. 7.—Normal early placenta, cross-section (high-power photomicrograph).

One other point in differential diagnosis which may occasionally present itself, is in the placenta of a dead nonsyphilitic child. Here, Fig. 8, we have villi which are normal in size or only slightly enlarged. The stroma cells have in large part undergone hyalinization and the few remaining ones are widely separated. The blood-vessels are no longer present and no trace of them remains. The epithelial cells have undergone considerable proliferation and in many places the single syncytial layer has been replaced by a stratified one, several cells thick. Cross-sections of these syncytial buds give rise to many so-called placental giant cells and the presence of large numbers of these structures would suggest a nonsyphilitic dead child. We have never known the placenta of a syphilitic child to present

this appearance and believe that lues can be excluded when these changes are present.

Changes in the placenta from patients suffering from nephritis, toxemia and eclampsia have been reported as presenting lesions indistinguishable from those seen in syphilis. While we cannot deny that such a thing is possible, we can say that it must be exceedingly rare, for in our experience there is nothing in the great majority of these placenta to suggest syphilis unless there is some other evidence of the disease.

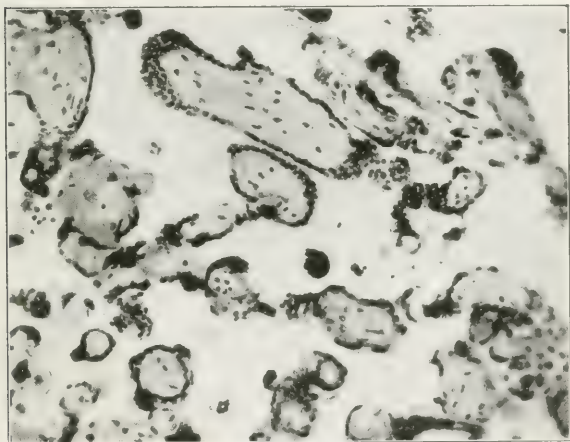


FIG. 8.—Placenta of dead nonsyphilitic child, cross-section (high-power photomicrograph).

The *Treponema pallida* are present in the syphilitic placenta in such small numbers that they can be demonstrated, if at all, only after a prolonged search. The time required for such a careful study is too great to make the method applicable for routine work.

The possibility of making a definite diagnosis of syphilis from the histopathological changes in the placenta has been subject to argument for years without the specificity of the changes being universally conceded. We feel, however, that when the changes which have been described are present they furnish very strong evidence of the presence of lues, whereas a normal histological picture does not exclude the possibility of the disease.

*Fetal Syphilis.**—In those cases where the child dies and comes to autopsy a further diagnostic possibility is available—the demonstration of the spirochete pallidum in the tissues. The method is comparatively simple and when positive results are obtained one can say with certainty that the child had syphilis, irrespective of any and all other evidence. This demonstration of the causative organism is the one absolute method of diagnosis and it furnishes an excellent opportunity to control the other tests.

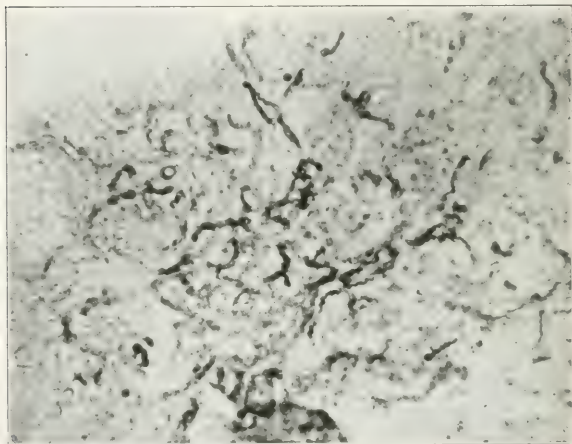


FIG. 9.—*Spirocheta pallida* in lung of macerated fetus, Levaditi stain (oil-immersion photomicrograph).

The tissues are best stained by the Levaditi method or some modification thereof. I have found the following technic very satisfactory: (1) Fix in 10 per cent. formalin (4 per cent. formaldehyd) for two days or more; (2) place in 80 per cent. alcohol for twenty-four hours or more; (3) wash in distilled water for twenty-four hours, changing the water several times; (4) place in 1 per cent. to 2 per cent. silver nitrate solution for three days in the dark at room temperature and for seven days in the thermostat at 37° C.; (5)

* NOTE.—The usually described changes in the organs in congenital syphilis furnish excellent evidence of the disease when they can be demonstrated but frequently the characteristic lesions cannot be made out and in the cases where maceration has begun routine histological work reveals nothing.

wash in distilled water for five minutes, using at least three changes of water; (6) place in the following solution for twenty-four hours at room temperature in the dark—pyrogalllic acid 3 grains, formalin (40 per cent. formaldehyd) 5 c.c. and distilled water 100 c.c. (always make up fresh just before using); (7) wash for twenty-four hours in several changes of distilled water; (8) run through the usual solutions and imbed in paraffin. Cut sections 3 to 6 μ thick and after fixing to the slide, remove the paraffin and mount in Canada balsam. Examine under an oil-immersion lens. In correctly treated preparations the spirochete are dead black in color and the surrounding tissues are a pale yellow. Not infrequently some of the connective-tissue fibrils and more rarely the cell membrane will appear black because of a deposit of the silver and may be very confusing. With care and a little experience, however, one can usually differentiate these artifacts from the spirochete by the fact that the latter show regular spirals of a remarkably constant size. If the tissues are not macerated, the section can be stained with toluidin blue in order to bring out the cellular structures more sharply.

According to general experience, the spirochete are most numerous in the adrenals, lungs and liver and the search may well be confined to these organs. The organisms usually tend to invade the connective tissue by preference and where they are rather few in number can best be sought in the walls of the blood-vessels or in the connective-tissue network of the organ. If, as particularly happens in macerated fetuses, the spirochete are very numerous they are rather diffusely scattered with, here and there, groups or colonies showing scores of organisms in a single field of the microscope. A differentiation of the type of spirochete is not considered necessary because no other spirillum is commonly present in the fetal tissues. A positive finding of even a single organism is of the utmost importance diagnostically but the failure to demonstrate the spirochete has much less value and should not deter one from making a positive diagnosis from other findings. The difficulties of the search are such that at best only an infinitely small portion of an organ can be carefully examined and when the organisms are very few in number they may readily be missed.

Results in Seventy-five Cases.—During the past four years I have done autopsies on seventy-five babies dead from all causes and have studied the organs for the presence of the spirochete and the placenta for the histological evidence of syphilis. In forty-seven of the cases the Wassermann reaction was determined on the maternal serum. Table I shows the results of the observations on the placenta and

the fetal organs and Table II cites the results of comparison with the Wassermann test.

TABLE I.—RESULTS IN PLACENTÆ AND FETAL ORGANS.

Placentæ.

	Macerated	Not macerated	Born alive
Placenta normal.....	19	10	13
Placenta syphilitic.....	21	2	4
Placenta suspicious.....	2	4	0
	42	16	17

Fetal Organs.

	Macerated	Not macerated	Born alive
Spirochete not demonstrated.....	19	11	11
Spirochete demonstrated.....	23	5	6
	42	16	17

In Table I it is seen that there is a close agreement in the number of positive findings in the placentæ and in the fetal tissues. A syphilitic placenta was noted in twenty-seven cases and in six other cases it was suspicious, whereas spirochete were demonstrated thirty-four times. The two methods did not give absolutely parallel results as can be seen in Table II. Among forty-two macerated fetuses, there were twenty-three which were definitely syphilitic, a percentage of 54.8. This differs considerably from the usual statement that 80 per cent. of macerated fetuses are luetic.

TABLE II.—COMPARISON OF THE WASSERMANN REACTION WITH THE PLACENTAL AND TISSUE FINDINGS.

	No. of cases	W.R. +	W.R. -	W.R. not done
Placenta normal, spirochete not demonstrated.....	35	8	15	12
Placenta normal, spirochete demonstrated.....	6	0	3	3
Placenta syphilitic, spirochete not demonstrated.....	3	2	0	1
Placenta syphilitic, spirochete demonstrated.....	25	13	2	10
Placenta suspicious, spirochete not demonstrated.....	3	2	1	0
Placenta suspicious, spirochete demonstrated.....	3	1	0	2
	75	26	21	28

From Table II one can see how closely the placental pathology agreed with the presence of the spirochete and with the maternal Wassermann reaction. Excluding the six cases where a positive diagnosis was not made on the placenta, the first two methods agreed absolutely in sixty (thirty-five normal and twenty-five syphilitic). The cases with syphilitic placenta and no demonstrated spirochete (Nos. 28, 31 and 56) may well have represented the class where longer search would have been more successful; whereas the six cases with normal placenta and demonstrated spirochete (Nos. 8, 10, 12, 13, 15 and 41) represent the small percentage of cases where there are no demonstrable lesions in the placenta in spite of definite fetal syphilis. In the series there were nine cases of toxemia and eclampsia, four of them definitely of the nephritis type, and in none was the placenta even suspicious.

The Wassermann reaction was performed on the mother's blood in forty-seven cases and the results show rather wide discrepancies when compared with the other findings. Thus in twenty-three cases, where the placenta was normal and the spirochete could not be demonstrated, the Wassermann was positive in eight cases. We believe that the histological evidence in these cases should receive some consideration and that the positive complement fixation in the mother's serum does not prove that the child had syphilis. Some substantiation of this scepticism is offered by the fact that in one case the father and in four cases the baby gave a negative reaction and that one other mother had a toxemia which is recognized as sometimes giving a positive reaction in the absence of lues. We do not believe that a negative test is proof of the absence of syphilis but taken with the other findings it makes us doubly certain that these children at least did not have syphilis. The tests were made on cord blood which we believe to be wholly fetal in origin and consequently of some value. The Wassermann on the fetal blood was done only in ten cases but it is interesting that it always gave a result which was confirmed by the presence or absence of spirochete.

In three cases, in which the placenta was suspicious and the spirochete were not demonstrated (Nos. 3, 24 and 63), the Wassermann was of considerable value in determining the diagnosis. In two cases it was negative while in the third (No. 63) it was positive but the negative fetal reaction indicated that the child probably did not have lues. In the two cases with a luetic placenta and a positive reaction but no demonstrated spirochete (Nos. 28 and 31) further search would probably have revealed the organisms.

TABLE SHOWING RESULTS IN INDIVIDUAL CASES.

Series No.	Service No.	Obstetrical history				Child			S.P. Wassermann reaction			Notes				
		Term	Prem.	Misc.	Abort.	Weight	Length	Condi- tion	Weight	Mx.	S.P. in tis- sues		Mat.	Fetal	Amn. fluid.	Pat.
1	O-5504	2				2200	41.5	Mac.	670	+	+	+	+			Lues contracted from second husband. Secondaries 6 months ago.
2	H-5374	0	0	0	0	1600	36.0	d. 1 1/2 h.	770	+	+	+	+			
3	H-5376	1	0	0	0	3200	49.0	Mac.	520	?	+	+	+			First child dead.
4	O-5518	1	0	0	0	2440	43.0	Mac.	730	+	+	+	+			Second child was S.B.
5	O-5517	4	0	0	0	500	27.0	Mac.	150	?	+	+	+			{ Last child was S.B. Secondaries 24 years ago.
6	H-5386	4	0	0	0	2010	47.0	Mac.	500	+	+	+	+			
7	O-5524	0	0	0	0	675	32.0	d. 2 d.	180	0	-	-	-			First child dead.
8	H-5403	1	0	0	0	3100	50.0	Mac.	500	0	+	+	+			This child first of twins.
9	O-5530	0	0	0	0	1660	37.0	Mac.	530	+	+	+	+			Luetin reaction on mother--negative.
10	H-5405	2	0	0	0	2500	44.0	Mac.	350	0	+	+	+			
11	O-5535	0	0	0	0	620	30.0	S.B.	300	?	+	+	+			Secondaries 1 year ago.
12	O-5536	2	0	0	0	1100	36.0	d. 30 m.	430	0	+	+	+			
13	H-5419	0	1	0	0	2500	46.0	d. 1 h.	580	0	+	+	+			
14	O-5562	2	0	0	0	1360	38.0	S.B.	325	+	+	+	+			
15	O-5549	0	0	0	0	2625	48.0	S.B.	530	0	+	+	+			
16	O-3408	0	0	0	0	920	?	Mac.	350	+	+	+	+			Premature separation of placenta.
17	H-6724	2	0	0	0	840	29.0	S.B.	210	0	-	-	-			
18	O-6593	0	2	0	0	?	46.0	Mac.	500	+	+	+	+			
19	H-6804	1	0	0	0	2920	49.0	Mac.	560	?	+	+	+			
20	O-6605	0	0	0	0	3240	47.0	S.B.	490	0	-	-	-			
21	H-6827	0	1	0	0	1800	47.0	Mac.	360	+	+	+	+			Spontaneous rupture of uterus.
22	H-6838	1	0	1	0	3380	52.0	S.B.	?	0	-	-	-			Child died from atelectasis.
23	O-6654	6	3	0	0	2150	47.0	Mac.	400	+	+	+	+			
24	H-6829	5	0	0	0	2175	45.0	d. 4 d.	390	?	+	+	+			
25	O-6668	2	0	0	0	2040	49.0	Mac.	580	+	+	+	+			
26	O-6671	2	0	0	0	500	25.0	Mac.	200	+	+	+	+			Chronic nephritis.
27	H-6896	8	0	3	1	3110	46.0	Mac.	2120	0	-	-	-			

TABLE SHOWING RESULTS IN INDIVIDUAL CASES (Continued).

Series No.	Service No.	Obstetrical history				Child			S.P. tis- in sues	Wassermann reaction			Notes			
		Term	Prem.	Misc.	Abort.	Weight	Length	Condi- tion		Weight	Mx. sues	Mat. Fetal		Amn. fluid.	Pat.	
28	O-6680	1	3	0	0	1925	45.0	Mac.	700	+	-	+	+			
29	H-6632	0	0	0	0	2000	50.0	Mac.	510	0	+	+	+			
30	H-6872	0	0	0	0	1930	49.0	Mac.	500	+	+	+	+			
31	H-6863	7	0	0	0	765	34.0	d.10m.	240	+	-	+	+			
32	H-7009	0	0	0	0	3300	54.0	Mac.	450	0	-	+	+			Eclampsia.
33	O-6795	9	0	0	0	680	32.0	Mac.	?	0	-	-	-		-	
34	O-6805	0	0	0	0	3060	50.5	d.30m.	690	0	-	-	-			Breech extraction.
35	O-6818	0	0	0	0	900	27.0	Mac.	290	0	-	-	-			
36	O-6839	1	0	0	0	2380	50.0	d.10m.	390	0	-	-	-			Chronic nephritis.
37	H-7135	0	0	0	0	3620	55.0	Mac.	480	0	-	-	-			Hydrocephalus.
38	H-7188	6	0	0	6	120	19.0	Mac.	90	0	-	-	-			
39	O-6922	0	0	0	0	2265	47.0	d.3h.	440	0	-	-	-			Toxemia.
40	H-7190	0	0	0	0	3190	52.0	S.B.	?	0	-	-	-			{ Premature separation of placenta.
41	O-6909	0	1	0	0	1700	40.5	d.1d.	390	0	+	-	+			
42	H-7205	0	0	0	0	1540	42.0	Mac.	480	+	+	-	-			
43	H-7218	0	0	0	0	2320	48.0	Mac.	530	+	+	-	-			
44	H-7208	2	4	0	0	3000	49.0	Mac.	680	+	+	Anti-comp.	-			
45	H-7222	5	0	0	1	1040	36.0	S.B.	375	0	-	-	-			Chronic nephritis.
46	O-6900	1	1	0	0	1470	39.5	d.1d.	520	+	+	+	?		+	
47	O-6789	3	2	0	0	920	34.0	Mac.	500	+	+	+	+		-	
48	O-6791	2	2	0	0	3070	52.0	Mac.	600	0	-	+	+			
49	H-7094	0	0	0	0	1040	37.5	Mac.	215	0	-	+	+			Pre-eclamptic toxemia.
50	O-6832	5	0	1	0	1020	27.0	d.2d.	310	+	+	+	+			
51	O-6800	2	0	0	1	4985	58.0	S.B.	790	0	-	-	-			
52	H-7001	0	0	0	0	2340	44.0	Mac.	480	0	-	-	-			Eclampsia.
53	H-7139	6	1	1	0	3740	53.0	Mac.	760	0	-	-	-			Eclampsia.
54	H-7137	0	0	0	0	1450	44.5	Mac.	200	0	-	-	-			Toxemia.
55	H-7150	0	0	0	0	3540	51.0	Mac.	520	0	-	-	-			

TABLE SHOWING RESULTS IN INDIVIDUAL CASES (Continued).

Series No.	Service No.	Obstetrical history				Child		S.P. in tissues	Wassermann reaction			Notes		
		Term	Prem.	Misc.	Abort.	Weight	Length		Condi- tion	Weight	Mx. sucs		Mat. Fetal	Amn. fluid.	Pat.
56	H-7141	5	1	0	0	1075	38.0	d.sh.	350	+	+	+		
57	H-7458	0	1	0	0	2550	47.0	Mac.	400	+	+	+		+
58	H-7447	0	0	0	0	3510	54.0	d.rid.	620	0	+	+		Bronchopneumonia.
59	O-7149	1	0	0	0	1810	35.0	Mac.	300	+	+	+		
60	O-7162	0	1	1	0	1360	40.0	Mac.	420	+	+	+	Anti-comp.	
61	O-7166	4	0	2	0	3625	50.0	d.rid.	590	0	+	+	+	+
62	H-7480	1	0	0	0	1500	?	d.rid.	370	0	+	+	+	
63	H-7515	1	0	0	0	375	26.5	d.3om.	150	?	+	+	+	
64	H-7516	0	1	0	0	?	?	d.1om.	975	+	+	+	+	
65	H-7495	0	1	0	0	2310	?	Mac.	575	+	+	+	+	
66	H-7483	1	2	0	0	1600	36.0	Mac.	230	+	+	+	+	
67	H-7528	1	0	0	0	1750	?	S.B.	500	0	+	+	+	Destructive operation.
68	H-7552	2	2	0	0	260	24.0	S.B.	100	0	+	+	+	+
69	H-7541	1	0	1	0	2900	?	Mac.	500	0	+	+	+	Anti-comp.
70	H-7547	1	1	0	0	5000	?	Mac.	850	0	+	+	+	Laked Anti-comp.
71	O-7157	4	1	6	0	50	7.5	S.B.	50	0	+	+	+	+
72	O-7213	1	0	3	0	1130	35.0	S.B.	240	0	+	+	+	+
73	H-7569	1	2	1	4	200	18.0	Mac.	100	0	+	+	+	+
74	H-7568	1	0	0	0	1580	42.0	d.12h.	420	0	+	+	+	+
75	H-7571	0	0	0	0	2650	48.5	d.4d.	539	0	+	+	+	+

Key to Abbreviations.

Mx. = Microscopic examination.
 S.P. = Spirochete pallida.
 Mat. = Maternal.
 Amn. = Amniotic.
 Pat. = Paternal.
 - = Negative or not found.

() = Out-patient number or normal.

H = House number.

Prem. = Premature labor (7-9 months).

Misc. = Miscarriage (4-7 months).

Abort. = Abortion (up to 4 months).

Case No. 27 is of interest because of the excessively large placenta—2120 grams, which showed no histological evidence of syphilis. The presence of a chronic nephritis in the mother may offer an explanation for the huge growth of the organ.

Case No. 42 is interesting in view of Colles' law. Here all the examinations of the fetus showed the presence of syphilis but the maternal Wassermann was negative. Cases Nos. 61, 62, 68 and 74, with positive maternal Wassermann reactions and negative fetal reactions coupled with normal placenta and on demonstrable spirochete in the fetal tissues present the opposite picture.

Conclusions.—(1) The syphilitic placenta is characterized by increased size and weight, abnormal proliferation of the stroma cells and an obliterative endarteritis and endophlebitis. For practical purposes the changes are specific and offer very strong evidence of the presence of fetal syphilis, whereas their absence does not exclude the disease.

(2) The demonstration of the *Treponema pallidum* in the fetal tissues affords an absolute diagnosis of lues but the failure of demonstration proves nothing.

(3) There are many discrepancies between the histopathological findings in the placenta and fetal tissues and the maternal Wassermann reaction and we believe that the complement-fixation test on the mother is of less value in accurately diagnosing fetal syphilis than the other two methods.

(4) The diagnosis of fetal syphilis should be attacked from all points and absolute reliance should not be placed upon any one method of diagnosis.

PRIMARY CARCINOMA OF THE VULVA.*

BY

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(With seven illustrations.)

COMPARED to the frequency of carcinoma of the internal genital organs in women, primary carcinoma of the vulva is a rare affection. The disease is distinctly one of advanced life, the patients, as a rule, being women who have reached the late sixties or seventies and even eighties. Youth is not exempt however and carcinoma of the vulva

* Read before the Section on Obstetrics and Gynecology of the New York Academy of Medicine, May 23, 1916.

has been known to occur in women of thirty or less, the youngest patient being a girl of twenty years (Ossing).

Metastatic or secondary vulvar carcinoma which does not enter into the present consideration, is occasionally observed but occurs very rarely in association with primary cancer of the ovary. Cancerous disease of the vulva has also been noted as the so-called "inoculation" carcinoma, after extirpation of uterine cancer.

In the literature primary carcinoma of the vulva is represented by about 270 recorded cases to which the author is able to add a personally observed instance. In connection with this case and on the basis of the original investigations of French and German writers a special study has been made of the regional anatomy of the vulvar lymphatics. The imperative necessity of radical interference is apparent in the text and even more forcibly expressed by the accompanying illustrations.

Author's Case.—Patient, Mrs. E. B., aged forty-eight years, admitted to the German Hospital on June 14, 1913. Family history as well as her own personal history of no interest except for the following facts: Thirteen years ago patient noticed a nodule on the right side of her outer genitals about midway between urethral opening and fourchette. This nodule was about the size of a small pea and hard. It itched very much and would bleed easily on scratching. Patient went to a doctor's office in Italy but he could not diagnose the case. This nodule lasted three years in its original size and then became somewhat larger. Patient paid no further attention to this until two years later when another hard nodule appeared near the first one and remained until the present time (altogether about seven to eight years).

Two months ago the external genitals and part of thighs became very much reddened and inflamed. Very severe pains occurred when the bowels moved, also severe burning pains on micturition. This continued up to time of admission. No backache but pain in legs. Felt very weak. Had lost about 7 pounds weight during the last six months. Slightly heavy and dragging sensation in her pelvis. No edema of the extremities. Appetite good. Bowels constipated. No headache, no cough.

Menstrual history: started at fourteen years. Regular, lasting eight days, painful, moderate amount. Has had eight children, miscarriage eighteen years ago between sixth and seventh child. Five children living.

Heart and lungs: normal.

Extremities: no edema. Has an atrophy of flexor muscles of the right leg. No knee-jerk obtainable on the right side. Normal knee-jerk on the left side.

Gynecological examination: at the upper junction of the labia majora and minora a hard, reddish, easily bleeding mass is to be seen. This mass occupies about the upper two-thirds of the right

labium majus and the upper one-third of the left labium majus. It also involves the clitoris which can no longer be distinguished, as well as the upper junction of the labia minora. The meatus urethra however seems to be intact. The whole mass bleeds quite easily on touch, is very tender, and some parts of it are necrotic, showing a grayish-green discharge. There is some induration of the adjacent surrounding tissue. This induration can be traced for about $\frac{1}{2}$ inch all around the diseased area (Fig. 1). Right inguinal



FIG. 1.

lymph nodes are enlarged and easily palpable but on the left side they cannot be felt. Bartholin's glands not enlarged. No vaginal discharge. The vagina admits two fingers, cervix firm and hard. Slight stellate tear. Uterus retroflexed and of normal size, fixed in its position by adhesions. Adnexa not palpable nor painful. No induration or tumor-like masses to be felt in the whole pelvis.

Diagnosis: primary carcinoma of the vulva (including the upper parts of labia majora and minora and the clitoris).

In order to exclude any possible mistake in the differential diagnosis between this disease and lues or tuberculosis, a small piece of the above-described mass was excised for microscopical examination,

The pathological report by Dr. Humphreys Chief of the German Hospital laboratory, was as follows:

Anatomical Diagnosis: epithelial growth from vulva (epithelioma).

Specimen consists of a small piece of tissue removed from vulva, region of clitoris. Microscopical examination shows an epithelial growth surrounded by a very marked round-cell infiltration. This epithelial growth extends downward from the epithelial lining and continues throughout the whole section. It is made up of squamous epithelium. Scattered throughout the whole section is a vast number of epithelial pearls. There is also a large number of newly formed blood-vessels and sinuses. A number of these blood-vessels are lined by a single layer of endothelial cells.

Operation was decided upon because of this report and was performed on June 24, 1913.

Wide sweeping incision made to right and left of each labium majus about $\frac{1}{2}$ inch outside of the diseased area. The diseased area as well as both labia majora and minora removed and the blocks of glands on the right side of the right inguinal region and also those on the left side removed.

The tumor did not appear to involve the deeper tissues. There was a good deal of bleeding which was controlled by clamps and ligatures. The external orifice of the urethra which was apparently not at all diseased, was left alone. The different wounds were closed entirely and only the lowest points of the wounds on both sides were drained.

Patient made an uneventful recovery and was discharged as cured on July 26th.

She was readmitted to the hospital however on Sept. 29, 1913, with the history that soon after she had left the hospital she began to have burning pains in the left outer part of the vagina. She had also some bloody discharge and complained of much pains after urination.

On local examination it was found that the urethral orifice was bulging. Anterior to the urethra there was a small ulcer which bled freely and was surrounded by an infiltrated cicatrix. The infiltrated area involved the anterior inner surfaces on both sides (site of former labia majora) and extended right down to the symphysis.

On examination the pelvis seemed to be free. No infiltration was to be felt in the inguinal region.

Diagnosis: recurrent carcinoma of vulva involving the outer orifice of the urethra.

Second operation: October 10, 1913.

The operation was performed as radically as possible, the infiltrated tissue being removed and both inguinal regions being cleaned out, but owing to the condition of the patient and the rather marked infiltration of the urethra, it was found impossible to resect the urethra in its entirety. Only the outer part of it was removed.

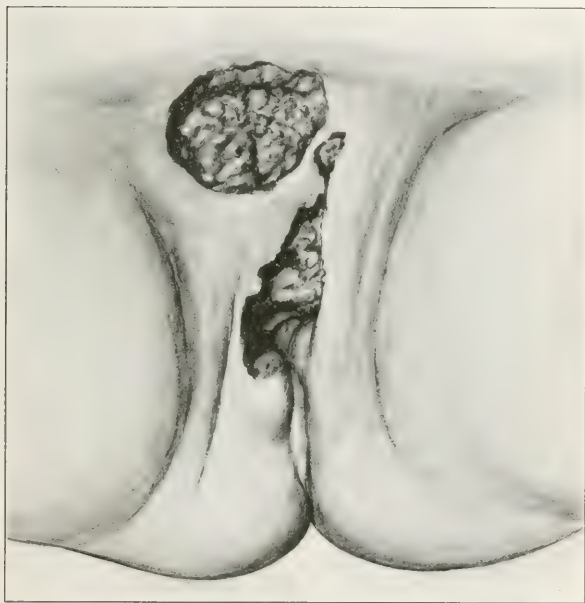


FIG. 2.

The pathological report showed the same type of carcinoma as described above.

Patient stayed at the hospital and was treated subsequently by Dr. Stewart, with x -ray cross fire and small doses of radium but in spite of this the patient became steadily worse and finally succumbed to the disease in January, 1914. The carcinoma had by that time invaded the area in between the thighs up to the hair line above

the symphysis, extending about 4 inches on both sides from the median line (Figs. 2 and 3).

The clinical history of this case has been given in some detail because on reviewing it hypercritically we find a fairly typical example of vulvar carcinoma with its slow insidious development, the difficulty of early recognition, the prolonged regional localization and the relatively slight subjective disturbances until an advanced stage of the disease. The treacherous character of these growths is also well brought out in the fact that at the time of the first operation the deeper tissues were apparently not involved. No radical operation (in the stricter sense of the word) was performed at this time and two months later there was a recurrence of the vulvar carcinoma which had now invaded the outer orifice of the urethra.

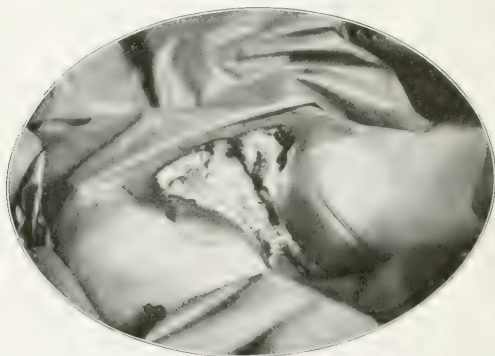


FIG. 3.—Showing final stage of primary carcinoma of vulva.

The second very radical intervention was supplemented by x-ray and radium therapy but the carcinoma relentlessly advanced and within a few months led to the patient's death.

In the absence of surgical intervention these cases usually prove fatal at the end of two or three years at most—some cases leading rapidly to a fatal end within a few months or even weeks. Death is sometimes hastened by the onset of femoral or intrapelvic phlebitis followed by embolism. The actual duration of the disease in a given case prior to the appearance of ulceration is not easy to determine, the first beginnings of vulvar cancer being usually overlooked.

Etiology.—Although a direct connection is not always demonstrable, predisposing factors are probably to be sought in warty

excrescences and papillomata of the skin such as were presumably present in the author's case thirteen years or so before the patient came under observation, adenomatous growths in the regional glands, kraurosis, and pruritus vulvæ. Traumatism can hardly be regarded as an etiological factor, for cancer of the vulva is rare whereas injury of the parts, for example birth traumatism of more or less severity, is extremely common.

Pathological Anatomy.—The point of predilection for the origin of primary carcinoma of the vulva judging from a comparative

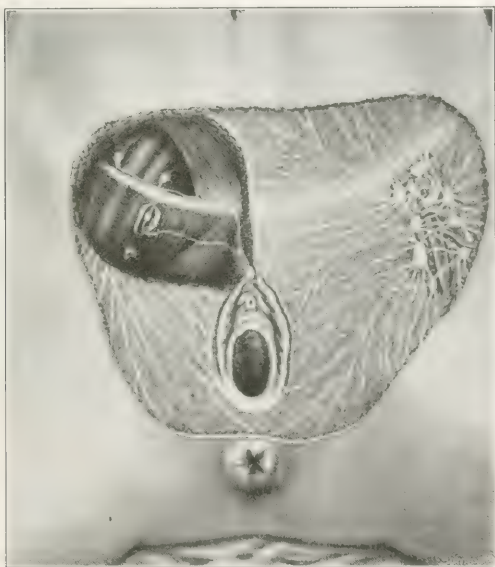


FIG. 4.—Showing the outer regional lymph glands of vulva. (From Crossen's "Operative Gynecology," 1915.)

study of the reported cases is in the labia majora and minora as well as the clitoris. Beginning as a small hard nodule or thickening of the tissue, as in the reported case, the growth extends from its starting-point to the clitoris, urethra, and external genitals, which finally become transformed into an amorphous tumor mass although even in advanced stages the primary tumor in the vulva

remains localized to a certain extent and recognizable as such. In the course of the extensive suppuration which follows, the large secondary cancers which have developed in the inguinal glands are liable to become infected and break down.

Metastases are limited, as a rule, to the regional as well as lumbar lymphatics, the glands in the groin being usually involved as well, whereas the iliac and hypogastric glands are less frequently affected. Involvement of the adjacent skin and mucosa of the external genitals results in so-called "contact" cancer, the "Abklatsch-

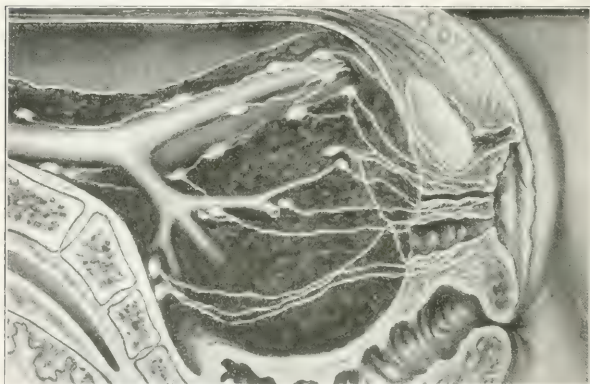


FIG. 5.—The lymphatics of the urethra and anterior portion of vagina passing backward directly to glands in the interior of the pelvis. (From Crossen's *"Operative Gynecology,"* 1915.)

Krebs" of German writers. The neighboring hollow viscera are directly invaded by the primary growth in a number of cases. In its continued development the cancer encroaches upon the pelvic connective tissue, especially the rectovaginal and vesicovaginal septum. The pelvic bones, more particularly the descending pubic ramus, may next become diseased and carcinomatous.

Especial importance is attached to the early involvement of the regional lymphatics, the external inguinal glands representing the first stage, the deep inguinal glands the second stage, the external iliac, hypogastric, and obturator glands the third stage of cancerous invasion. The involvement of the lymph glands in the surroundings of the rectum seems probable but has not as yet been positively

established. In view of the important part played by the lymphatics of the vulva in the distribution of cancerous material, a brief review of the regional anatomy is added for better orientation (Figs. 4 and 5).

On the basis of his anatomical studies of the iliopelvic lymphatics and glands, Marcille (1902) emphasizes the abundant glandular and lymphatic connections of the organs in the small pelvis and the resulting difficulty of a radical cure of pelvic cancer. Attention is called by him to the fact that the vulvar network of lymphatics which is tributary to the inguinal glands, is distinctly separated by

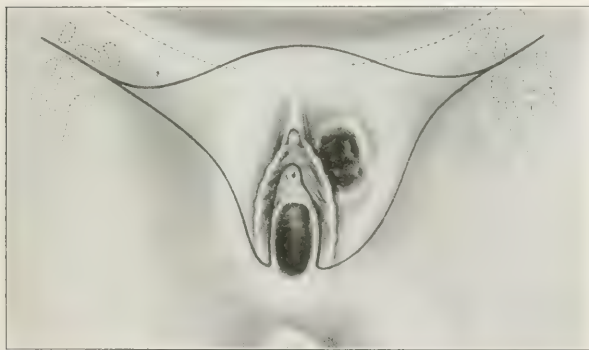


FIG. 6.—Outlines for the block excision of the external genitals for carcinoma.
(From Crossen's "Operative Gynecology.")

the hymen from the vaginal lymphatic plexus, which is tributary to the pelvic glands. This separation is especially marked in children where no vaginal lymphatics terminate in the inguinal glands. As shown by Poirier, mercury injections within the hymeneal septum in children pass to the lymph vessels going to the pelvic glands, whereas injections applied on the vulvar side of the septum reach the lymph vessels going to the inguinal glands. In adult women it is possible for injections made at the level of the lower vaginal portion to reach the inguinal glands, not through direct collecting channels, but by way of numerous anastomoses which unite the vaginal network with the vulvar network. The existing anatomical relations were pointed out by Bruhns (1898) as the confirmation of the well-known clinical fact that a pathological process of one labium will

cause swelling of the inguinal gland groups of both sides. He showed a connection through lymph tracts between the labia majora and minora of one side and the inguinal glands of the opposite side; also pointing out the continuity of the lymph tracts of the labia majora and minora with those of the clitoris. The efferent trunks usually empty into the internal and upper group of the superficial inguinal glands. The lymphatics of the vaginal mucosa and muscularis are connected and their efferent trunks usually pass to the glands on



FIG. 7.

both sides of the hypogastric artery. The lymphatics of the vaginal wall adjacent to the hymen also communicate with the lymphatics of the labia and thereby with the inguinal glands.

In the most recent authoritative contribution to the anatomy of the lymphatic system of the pelvis and abdomen Poirier and Cunéo give the following account of the vulvar lymphatics, quoting in part from Sappey's older work:

"The lymphatics of the vulva arise from a network the extremely close meshes of which are superposed in several planes. This network covers the fourchette, the meatus urinarius, the vestibule, the clitoris, the labia minora, and the internal surface of the labia majora. It is so loose and close throughout that when it has been

well injected it presents at first sight merely an ashy gray appearance. To distinguish the innumerable silvery filaments of which it is composed we must use a magnifying glass. On the external surface of the labia majora the network composed of smaller and larger branches becomes sufficiently distinct to be recognized by the naked eye (Sappey). From the periphery of this network of origin run the collecting trunks. The direction of these trunks varies according to their point of origin. Those which come from the anterior third of the vulva run directly upward and forward toward the mons veneris; there they turn sharply and run transversely toward the superficial inguinal glands. The trunks which come from the posterior two-thirds are directed upward and outward and directly reach their terminal glands. The majority of the lymphatics of the vulva terminate in the glands of the internal-superior group. Some of them may end in the internal-inferior group. It is even possible, though much more rare, to see some of these vessels reach a gland belonging to one of the two external groups. The vulvar lymphatics are far from being confined to a perfectly definite glandular group. When injecting one-half of the vulva the mass may frequently be seen to reach the glands of the opposite side. The injection of these glands may take place by a double process. Sometimes it is effected on account of the continuity of the network of origin of the two sides of the vulva in the middle line; at others it is due to the fact that some of the collecting trunks cross the middle line and end in the inguinal region of the opposite side. In all cases when dealing with an epithelioma of the vulva the inguinal glands of both sides should be regarded as liable to infection. Surgical interference in epithelial tumors can be efficient only when combined with radical extirpation of the glands, for the lymphatics are invaded from the very beginning and although sometimes apparently intact they are always altered histologically."

The lymphatics of the clitoris, instead of passing into the superficial inguinal glands like the other vulvar lymphatics, pass from the primary plexus in several collecting trunks along the dorsal surface of the clitoris to the front of the symphysis, where they anastomose forming a plexus which gives off two sets of collecting trunks. One lymph vessel, passing along the inguinal canal to the external retrocrural gland, is usually encountered beneath the round ligament, while other lymphatics pass toward the crural to their termination in a deep inguinal gland, the internal retrocrural gland and the so-called gland of Cloquet.

The urethral lymphatics in the female drain into the middle and

outer chain of the external iliac glands, the hypogastric glands, and the glands of the promontory.

The practical application of the anatomical findings is very clearly and concisely summarized by Crossen (*Operative Gynecology*, 1915, p. 476) as follows:

1. "From a cancer of the labium majus or minus all the lymphatic distribution in the early stage is likely to be to the inguinal glands.

2. This distribution may extend not only to the side on which the lesion is located but also to the opposite; hence the glands on both sides should be removed.

3. In cancer of the clitoris, a very early distribution to the glands *inside* the pelvis is probable.

4. In cancer of the urethra also, invasion of the interior of the pelvis is favored by the lymphatic distribution."

Microscopical Pathology.—Primary carcinoma of the vulva originates from the pavement epithelium of the skin and the epithelia of the sweat glands including Bartholin's gland. Incipient cases permit no distinction between the four types of carcinoma, namely, flattened cutaneous cancrroid, papilloma in form of a sessile, more rarely pedunculated cauliflower growth; infiltrating carcinoma, an especially malignant form; and carcinoma of Bartholin's gland, a distinct and very unusual type with only sixteen recorded cases (Fabricius, Schaeffer, Frank, Schweizer, Trotta, Pape, Mackenrodt, Burghale, Gross, Godert, Grahm, Frisch, Sitzenfrey, Wolff, Latzko, Spencer). The most common form of cancer of the vulva is a slowly growing cancrroid which may still be followed by recurrence several years after its operative removal. Some observers are disposed to believe that in carcinoma of the vulva the regional lymph glands are often affected simultaneously or nearly so with the onset of the primary tumor. Not infrequently cancer tissue is microscopically recognizable even in very small lymph glands not exceeding the size of a hemp seed.

Symptoms.—Carcinoma of the vulva may not cause any disturbances for a considerable length of time and is apparently painless until the growth has ruptured through the skin. These patients are, therefore, not apt to seek advice before ulceration has begun and often complain only of local soreness and a burning sensation on micturition. There is usually a history of a small painless nodule (see author's case) or a superficial ulcer with a tendency to bleed more or less, gradually increasing in size without serious disturbances of a local or general character. Profuse hemorrhage and discharges

are rare and never appear until late in the disease. Pruritus is in many cases one of the earliest symptoms of vulvar carcinoma.

On *examination* the location of the tumor in the vulva in the majority of the cases is discovered in the labia majora, more particularly on the internal surface. Swelling of the lymph glands in the groin is almost invariably demonstrable no matter how small and apparently insignificant the vulvar tumor. This premature enlargement of the inguinal lymphatics is probably not the result of infection of the tumor surface associated with inflammatory swelling, but in view of the very frequent glandular recurrences after radical operations must be interpreted as a manifestation of early metastasis.

The malignancy of carcinoma of the vulva as well as the symptomatology are illustrated by the following instructive case, recently reported by Frigyesi in Budapest:

The patient a woman forty-six years of age, noticed one year ago a swelling of the vulva the size of a hazelnut, which caused severe itching and was removed. When she came under observation ten months later, the vulva on examination was found to be reddened, swollen and painful; the inguinal lymph glands on both sides were more or less enlarged up to the size of a bean. The right labium majus was shrunken and atrophied, whereas the left labium majus and minus were occupied from the prepuce of the clitoris downward by a large cartilaginous tumor the size of a fist, with an eroded and bleeding inner surface. The growth began in the middle line extending anteriorly to the urethral bulb and posteriorly for a distance of $1\frac{1}{2}$ cm. to the vaginal wall. Exploratory excision showed the tumor to be a carcinoma.

Diagnosis.—The recognition of cancer of the vulva is usually easy. Syphilis and tuberculosis having been excluded, the growth can in most cases be identified without difficulty by the induration which extends deeply into the connective tissue; the cauliflower-like smeary surface; and the crater-like eroded margins. An exploratory excision of tumor tissue is very rarely required. The microscopical findings in these cases do not differ in any particular from the cutaneous carcinomata affecting other regions of the body. In a case recently reported by a Russian observer (Grintschar) the microscope showed cancer nests only underneath these points where the epidermis was considerably thinned or eroded, namely, in the presumably older portions of the growth, the marginal fields merely presenting chronic inflammatory changes. In this case which concerned a woman fifty-five years of age, the first manifestations had appeared four years previously in the form of pruritus, followed

by itching nodules of the vulva which two years later began to ulcerate. Examination showed hypertrophy of the prepuce of the clitoris and of the right labium minus, which were covered with partly eroded and ulcerated nodules. A hard cartilaginous infiltration was palpable under the erosions.

Treatment.—In view of the hopeless prognosis in neglected cases which reach the surgeon's hands too late, early operative intervention is imperative. The unfavorable outlook of vulvar carcinoma can be improved only by radical operative procedures, abandoning the older method of removing only the external inguinal glands. Even when not demonstrably diseased, these glands must be extirpated without fail on both sides on account of the early occurrence of metastases in this region, due to the number of deep anastomosing lymphatics in the mons veneris. Provided the carcinoma has not yet attained considerable size and the inguinal glands are not yet changed or suspicious, the extirpation may be restricted to the removal of the superficial and deep inguinal glands on *the two sides*. Very radical procedures including the removal of the deep iliac and hypogastric glands (see illustration No. 5) are indicated in the presence of a large ulcerative tumor, especially of the most malignant infiltrative type, and in youthful or pregnant women. The tumor must be extirpated well within the healthy tissue and expert operators evacuate both inguinal regions down to the large blood-vessels, dissecting the glands, fat tissue, and lymphatics in connection with the growth, and removing the package as a whole. These radical measures, proposed by Kehrer, are not unconditionally needed in all cases, and the choice of the operation is governed to a certain extent by the requirements of a given case. The type of carcinoma, the age of the patient and her general condition must all be taken into consideration. It is doubtful if such radical and extensive treatment is altogether justified in feeble and decrepit women in the seventies and eighties who represent a large percentage of these cases.

The *extraperitoneal procedure* as described by Stoeckel begins with an incision parallel with Poupart's ligament from the inguinal ring nearly to the anterior-superior iliac spine, continued along the anterior third of the pubic crest. After the peritoneum has been pushed aside, the ureter is exposed in its entire course as well as the large iliac vessels—(as in the Freund-Wertheim operation for cancer of the uterus)—and in their surroundings as much as possible is removed of the pelvic connective tissue and the glands in continuity with the deep and superficial inguinal glands.

The *extended radical operation by the intraperitoneal method* was first advocated by Stoeckel (1912) who recommends the removal of *all* the pelvic glands, the iliac and hypogastric as well as the superficial and deep inguinal, in carcinoma of the vulva. The first-named glands are removed first of all by way of a median laparotomy incision. The laparotomy wound having been closed, the inguinal glands are next removed by way of two oblique incisions above the inguinal ligaments. At the point where the laparotomy incision and the curved incision from one iliac spine to the other meet, a vertical incision is applied, which passes downward over the symphysis encircling the vulva. Next the vulvovaginal tissue is detached from the bone together with the tumor. This is followed by suture of the wound and permanent catheterization of the bladder.

Routine laparotomy, in Stoeckel's opinion is a very desirable preliminary and improvement of the operation and he recommends its performance as a valuable first step in all operations for cancer of the vulva. A patient recently operated upon by him according to this plan made a good operative recovery. In another case which was operated upon according to the customary method, namely, extirpation of the total lymph gland apparatus from the anterior-superior iliac spines in connection with the entire vulva, the wound healed by first intention but a small nodule developed in the vaginal cicatrix on the right side, evidently an inoculation-recurrence as it was found on examination to be carcinomatous.

In the following adaptation from Crossen the operative technic to be followed is concisely summarized for greater convenience: Avoid incision into involved tissue to guard against grafting of cancerous material and inevitable recurrence. The block of excised tissue should include the external genitals with a wide margin of skin about the lesion, the lymph vessels passing upward and outward to the inguinal glands, and the packets of glands on both sides.

First Step.—Circumferential incision around the skin surface to be removed including a wide margin about the lesion and the surface covering of the external genitals on both sides and outward for a considerable distance over the lymphatic vessels of each side. Where the vulvar lymphatics are more deeply situated, near the glands, a simple skin incision and reflection will be sufficient. As some lymphatic vessels pass upward a considerable distance before turning outward, and even occasionally run across to the opposite side, the superficial tissue should be excised well up over the pubes.

Second Step.—Block excision, beginning with dissection of the gland mass on each side with the directly adjoining tissue and the

tissue containing the vulvar lymphatics. As contamination can hardly be reliably excluded it is safer to remove the entire glandular mass in the inguinal region around the saphenous opening. Injury to the important veins underneath must be carefully avoided. From being skin deep at first over the gland area, the incision as it approaches the vulva is deepened through all the superficial tissues, cutting straight through the structures down to the muscle and fascia.

Third Step.—Removal of the tissue-block guarding against injury of the urethra. Contraction of the urethral orifice may be safely prevented by preservation of a narrow strip of vestibular lining, as its lymphatics run in an outward direction.

Fourth Step.—Covering of the large raw wound area by means of tension sutures, relaxing incisions, and sliding flaps, according to the requirements of a given case, always keeping in mind the avoidance of harmful tension at any point. Instead of incurring the risk of sloughing through overtension of tissues it is better to have a bare surface to close by granulations. The function of the urethra must be safeguarded, however, by the best possible accurate approximations of the margins about the meatus, so as to avoid subsequent contraction of scar tissue with its concomitant disturbances.

Radiation, with *x-rays*, *radium*, and *mesothorium*, is a recent addition to the treatment of vulvar carcinoma, but has led to such contradictory results that there is no unanimity concerning its value in these cases. Mesothorium, according to Winkler, acts much more energetically upon the cancer cells and has a more rapid effect than *x-rays*. Upon the basis of personal experience in two cases he states that *x-ray* radiation, hard or soft, is not suitable for cancers of the vulva, as enormous quantities of rays are needed to produce a visible effect. Mohr (1913) was unable to obtain any results through radiotherapy in two cases whereas Hermann in the same years claimed to have cured recurrent cancers of the vulva by means of *x-ray* treatment. Schmidt (1913) recommends surgical treatment of superficial cutaneous carcinomata with regional glandular swellings, and radiation of recurrences in the cicatrices, utilizing soft tubes for the radiation of the tumor and hard tubes for the radiation of the glands.

Although the results as to a permanent cure cannot be reliably known before the end of at least three and preferably five years after the institution of radiotherapy, the beneficial action of mesothorium is sometimes so marked in very old and feeble patients, that the superiority of radical operative treatment is questionable.

Results of Operative Treatment.—In reporting the permanent results in the cases of vulvar carcinoma operated upon during three years in the Kiel Gynecological Clinic altogether eighteen cases, including twelve with notes as to recurrence—Ossing (*Inaugural Dissertation*, Kiel, 1913) contributes the following statistics: Five patients remained well, five had recurrences, one woman died of so-called “abdominal cancer.” The five recurrences were all operated upon but all these patients died sooner or later after the operation. One patient was well at the time of the report, six months after operation for a recurrent carcinoma of the vulva. In the other patients who remained well, the operation for the primary vulvar cancer dated back from eight months to nearly ten years. In the case of the oldest patient, a woman eighty-two years of age, the enlarged inguinal glands were left behind, but she had remained free from recurrence for over eight years at the time of the report.

The numbers of permanent cures, accepting as the standard the patient's freedom from recurrence for a postoperative period of five years, is deplorably small judging from the figures given by Kehrer, who emphasizes moreover that recurrences have been known to follow at the end of six or seven and even eleven years after the operation. Accordingly the five years freedom from recurrence which is usually the measure of a permanent cure in cancer of the uterus does not apply to carcinoma of the vulva which can hardly be regarded as definitely cured when six or seven years have elapsed since the operation.

The adoption of the modern radical procedure would seem to be rational in the rare cases of advanced vulvar carcinoma with a fairly good general condition. In incipient and less extensive cases or in very old and feeble patients operative interference will necessarily be restricted to a thorough evacuation of the inguinal glands, beside the extirpation of the primary tumor. Time must show if the results of the radical operation, inaugurated in the recent past, will entitle it to become the method of election in the treatment of carcinoma of the vulva.

NOTE.—Since this article went to press it has been the author's good fortune to observe another unusual case of primary carcinoma of the vulva.

Mrs. R. S., fifty-five years of age, admitted to the German Hospital, New York, August 11, 1916. The patient stated that up to six months ago she had been in good health. At that time present illness began with intense itching in the region of outer genitals.

This symptom was the patient's only complaint for three months but she then felt a small "pimple" in the region of the outer genitals which gradually increased in size. Two weeks later the patient first felt a small hard nodule in the region of the present tumor which ulcerated after a month, secreting a thin, scanty, seropurulent discharge which was nonodorous. Ulceration was never painful nor tender, was always solitary and never broke down, the only concomitant symptom being the early, constant and intense itching of the outer genitals, which alone drew the patient's attention to her condition. No symptom referable to any organic lesion elsewhere, all other internal organs being normal. Right breast missing, radical amputation having been done five years ago at this Hospital for supposed carcinoma of the breast, the pathological diagnosis, however, being chronic mastitis. Patient has had seven children, no instrumental deliveries. Menopause three years ago. Prior to this no symptom of pathological menstruation. Family history negative.

Vulva.—Conforming to an area on the inner surface of upper third of right labium majus between clitoris and labia is situated a circular elevated ulceration about the size of a twenty-dollar gold piece. The base is smooth but irregularly elevated and punched out, especially the inner half, giving it a fungoid appearance, the color being of dull red. The granulations are bathed here and there with a scanty seropurulent secretion. The margins of the neoplasm are irregularly elevated and inverted but with a sharp circumscribing line of demarcation from adjacent tissue which is not infiltrated, there being moreover no tendency toward cicatrization of any previously existing ulceration or repair of the present one in its dissemination. The neoplasm is not painful nor tender, appears vascular but does not bleed, is distinctly indurated especially at the margins which are very firm.

The inner surface of the ulceration overlaps the clitoris and opposite labia but there is no evidence of any apposition implantation or other means of involvement of remaining parts of vulva or glands. On retracting the right labium majus the external surface of the præputium clitoridis is seen on the right side to be distinctly infiltrated and on the interior surface there is a pea-sized ulceration of the same consistency and appearance as the tumor just described. Inguinal glands nor palpable.

Vagina small, shows signs of senile involution as does also the uterus which is anteflexed and of a normal consistency. Adnexa and parametria are perfectly normal, in fact the whole internal genital organs show no involvement from above described tumor.

Diagnosis.—Primary carcinoma of vulva (right labium majus).

Operation.—August 18, 1916. Butterfly shaped incision (similar to Fig. 6) taking in both labia majora and minora, the clitoris and prepuce of clitoris, all in one piece. The incision around the tumor taking in about one-half inch of sound tissue. Enlarged glands are nowhere to be detected.

In order to get a good approximation two relaxation incisions were

made on the inside of each thigh. The adaptation of the wound margins was easily accomplished and the wound closed with interrupted chromic catgut sutures. A permanent catheter was inserted in the bladder. An inguinal incision was made on each side and all the glands are removed. None were found to be enlarged.

The pathological examination of tumor shows (in brief) typical squamous cell carcinoma (epithelial pearls) invading connective tissue.

Prior to the operation several Wassermann tests were made, all, however, being negative.

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11 EAST SIXTY-ELIGHTH STREET.

THE CORRECTION OF THE OBESE AND RELAXED ABDOMINAL WALL WITH ESPECIAL REFERENCE TO THE USE OF BURIED SILVER CHAIN.*

BY

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(With eleven illustrations.)

ALTHOUGH not infrequent in men and in persons under thirty years of age, weakness of the anterior abdominal wall occurs chiefly in women of middle age or advanced years. It may be local and limited to a single area of the abdominal wall, or general involving the entire abdominal wall. When diffuse the fullness and relaxation is usually more evident in the lower abdomen than in the upper.

We may divide general relaxation of the abdominal wall into three degrees.

First, that form in which the relaxation is not sufficient to cause the anterior abdominal wall to prolapse over the pubis or Poupart's ligament when the patient is in the erect posture (Fig. 1).

Second, a degree in which, with the patient erect, a fold of the anterior abdominal wall hangs well over the pubis and over Poupart's ligament, but does not approximate the thighs (Fig. 2).

Third, a degree in which, with the patient erect, the relaxed abdominal wall hangs some distance down over the thighs.

The symptoms produced are:

First, a sense of weight, dragging and discomfort felt in the abdomen and back, associated with weakness and alteration in gait and carriage, due to the change in the normal center of gravity of the body.

Second, ptoses and displacement of the viscera with the secondary symptoms due to the angulation, stasis and obstruction that may result from visceral displacement.

* Read before the Philadelphia Obstetrical Society, May 4, 1916.

Third, relaxation and distention of the stomach and intestines, due to the lack of the normal support exercised by the anterior abdominal wall and a reduction in the normal intraabdominal tension.

These patients, therefore, suffer from indigestion, headache, flatulence, constipation and many other symptoms, and often are greatly handicapped when in the erect position.



FIG. 1.—Type of obesity, abdominal relaxation and umbilical hernia suitable for treatment by lipectomy and reconstruction of anterior abdominal wall.

Etiology.—The weakness of the abdominal wall may be congenital, or it may be due to overdistention of the abdominal wall, as from pregnancy, ovarian tumors, or ascites, or be the general relaxation associated with wasting and debilitating disease. Obesity increases the intraabdominal tension, weakens by fatty infiltration the supporting walls, and adds the drag of an increased subcutaneous mass. The weakness may be due to nerve injury or paralysis, particularly is this true where long vertical incisions have been made

through the anterior abdominal wall, external to the semilunar line. Extensive incisions, especially where drainage has been employed or simple through-and-through sutures used, are likewise frequently followed by hernial defect. The unfortunate tendency of some surgeons in secondary operations, never to use the same area that has been employed by a previous surgeon in operating upon a patient, is an important factor. One of our patients, a clergyman, had had nine operations and each surgeon made a different incision,



FIG. 2.—Incisual hernia, obesity, and abdominal relaxation before reconstruction operation.

so that it was difficult to pick out a part of the abdomen that had not been preëmpted by another's scalpel.

The treatment of the weak abdominal wall may be divided into palliative and operative treatment.

Palliative treatment includes methods that aim to develop the weakened musculature, and the use of a supporting appliance, such as a corset, belt, or spring truss with or without a pad or plate. I shall not discuss the palliative treatment at this time.

Operative measures for the correction of the incompetent anterior abdominal wall include one or more of the following general principles.

First, the resection of an elliptical or other shaped area of skin to increase the tension upon the underlying structures.

Second, a lipectomy or resection of the subcutaneous fat to eliminate this source of weight and tension upon the underlying parts, and to better contour the abdomen.

Third, a reconstruction of the fascial and muscular planes of the anterior abdominal wall.

Fourth, the reinforcement of the abdominal wall by the implantation of new tissue or of foreign substances, such as, silver wire, kangaroo tendon, etc.

In the obliteration of such defects as result from diastasis, incisional or other traumatic openings, or hernias, wide resection is at times necessary to find and to liberate the edges of the tissue layer involved in the defect. Thus in the patient mentioned, who previously had had nine abdominal operations, no muscular or aponeurotic tissue external to the right rectus was found until the flank and the region of Poupart's ligament was reached. By thoroughly freeing the retracted tissues, however, it was possible in this case to approximate the rectus edge to the liberated aponeurotic and muscular edges brought up from the side of the abdomen.

To strengthen the deeper abdominal wall two methods are employed:

First, imbrication in which one edge of the separated muscular and aponeurotic layers is lapped over the other, the imbrication being from above downward or from side to side as seems best in the particular case. Frequently the double layer thus secured on account of the stretched and attenuated tissue is none too thick or strong.

Second, a method that may be termed an imbrication by layers, in which the abdominal wall is split into its component parts, and each layer as far as is feasible imbricated with its corresponding layer: peritoneum to peritoneum, posterior layer of the rectus lapped upon posterior layer of the rectus, substance of one rectus to substance of the opposite rectus, and the anterior sheath of the rectus lapped upon the anterior sheath by the rectus.

Often the conditions are such that a sufficiently strong abdominal wall is not obtained in any of these ways. Under such circumstances additional support may be obtained by autoplasmic or homoplastic transplantation of fascia, or by the use of alien substances imbedded into the anterior abdominal wall. Pedunculated aponeurotic flaps may be slid from one part of the abdomen to another, as in Coffey's operation, or, as a free transplant, an area of the fascia lata may be

dissected and used to reinforce the anterior abdominal wall. For such extensive defects as are seen in the new-born, and after very destructive injuries in which insufficient local tissue can be secured to bridge the area, I should not hesitate to implant the left forearm of the patient into the defect in the abdominal wall as a temporary measure, the skin of the forearm, of course, being first turned back. Such exigencies are unusual, but it is not unusual to find it desirable to use the additional support secured from an alien substance. For this purpose strips or plates of celluloid, metal or other substance are hardly feasible. Reinforcement by a lacing with silk, celluloid linen, silk-worm gut, kangaroo tendon or similar suture material is likewise undesirable, as these substances may produce irritation, or, as in the case of catgut, be absorbed. Certain metals, especially silver, are particularly well borne when introduced in the form of fine strands, and the use of a buried filigree of fine silver wire, as suggested by Willard Bartlett⁽¹⁾ has proved of great value. While a number of our patients have obtained a very satisfactory reinforcement of the abdominal wall by the use of the filigree, we have noted the following disadvantages.

First.—Technical Difficulties.—The delicate transverse loops of soft silver wire are easily displaced or distorted by the pressure of the tissues or in sponging the wound, and instead of being able to anchor the filigree by a single catgut suture placed at one end as has been recommended, we have found it desirable to anchor each loop individually to the adjacent tissue. As the filigree may have from forty, to two or three hundred transverse loops, to tack each one in position even by a continuous suture of fine catgut requires a considerable period of time. In the reconstruction of the anterior abdominal wall where extensive imbrication is necessary, we have rarely found it feasible to smoothly implant large filigrees, that is, those 5 inches in length and 4 or 5 in breadth or larger, beneath the aponeurosis of the external oblique, or beneath the attenuated rectus muscle, and we have had to be content with partially affixing the filigree in position over the aponeurosis of the external oblique or the external sheath of the rectus. Even upon this large free surface the slightest movement of the overlying flap in the closure of the wound, or any increased tension of the skin tends to distort and displace the loops of filigree so that we have found it desirable to use a fine suture to fix each loop in position.

An x-ray examination of a number of these patients shows that a later displacement of some of the loops occurs, and that there is a marked tendency as has been recorded by Ochsner and Bartlett

for the filigree to become fragmented (see Fig. 3), through breakage of the separate strands of silver wire. Although, as Bartlett has written, the breaking of a number of the strands of the filigree does not seem to greatly weaken the reinforced abdominal wall, it indicates an undesirable lack of flexibility. A few of our patients have complained of pain in the abdominal wall, which we have been

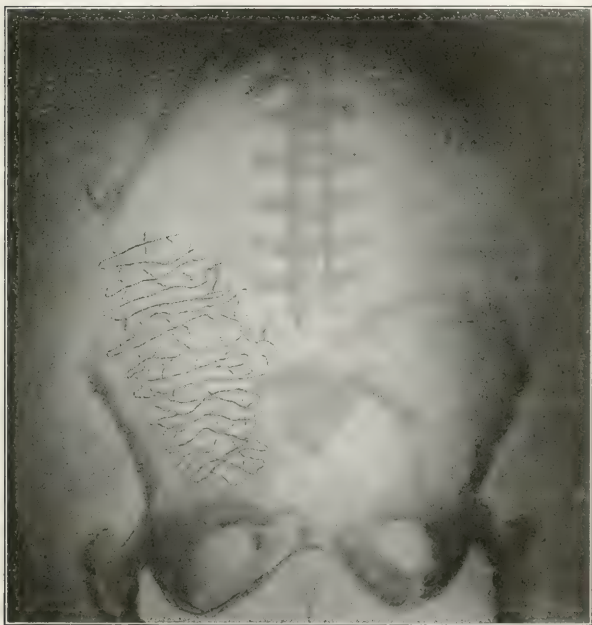


FIG. 3.—Illustrates the fragmentation of silver-wire mesh implanted in the anterior abdominal wall. (*Redrawn from skiagram.*)

tempted to attribute to the sharp ends of broken wire. We have been prompted therefore to search for a more flexible and durable nonabsorbable material for reinforcing the deeper layers of the abdominal wall in operating for marked degrees of relaxation or large hernias, and during the past two years have used very fine silver chain as employed by jewelers. This sterling silver chain may be

compared to catgut, the size and strength of which is shown in the following table.

TENSILE STRENGTH OF GOOD RAW AND STERILIZED CATGUT,
SLOW PULL.*

Double surgeon's knot, single strand.

Tensile strength	Gauge
No. 0 average 5 lb.	No. 0 27-28
No. 1 average 8 lb.	No. 1 26
No. 2 average 10 lb.	No. 2 24-25-26
No. 3 average 13-16 lb.	No. 3 23-24
No. 4 average 14-18 lb.	No. 4 22-23
No. 5 average 16-20 lb.	No. 5 21

The tensile strength of the silver chain is much greater than that of a virgin silver wire corresponding in size to that used in the links of the chain. For example, the usually employed virgin silver wire of 27 English gauge, broke at $2\frac{1}{2}$ pounds strain, while one specimen of sterling silver chain made of 27 gauge wire showed a tensile strength of $13\frac{1}{2}$ pounds.

The amount and character of alloy and the size and shape of the links markedly influences the strength of the chain. For example, of three chains, one made of 26 gauge sterling wire broke at $3\frac{1}{2}$ pounds, one of 27 gauge at 11 pounds, and one of 27 gauge at $13\frac{1}{2}$ pounds. Apparently within limits chains with small links are stronger than those with larger links. The tensile strength of the chain compares very well with that of catgut used in suturing, and the open links permit an anchorage from the ingrowth of fibro-connective tissue that cannot be obtained where a simple wire is employed. The chain is perfectly flexible and will not fragment or break with the movements of the abdominal wall. In one of our patients the usefulness of the chain in withstanding tremendous intraabdominal tension was shown. In this obese woman with a relaxed abdominal wall, an enormous incisural hernia and many intraabdominal adhesions, the abdominal cavity was greatly reduced in size and the abdominal wall reinforced by imbrication and supported by about 4 feet of silver chain introduced as shown in Fig. 5. The patient slowly developed an enormous abdominal distention from a kink of descending colon. Several days after the operation in starting to cut the bandage about the abdomen, the abdominal distention increased so greatly that it seemed that the incision would burst asunder if the bandage were removed, a new bandage was therefore applied and the patient later removed to the

* S. Trenner.

operating room, when on removing all support and opening the skin incision, it was found that the silver chain was giving a perfect support to the deeper layers. On loosening the attached ends, the chain was readily withdrawn and a simple introduction of a drainage tube into the transverse colon was followed by an evacuation per anus and recovery.

In this case I do not believe that the deeper layers would have held without the silver chain reinforcement. Bartlett(2) has shown that

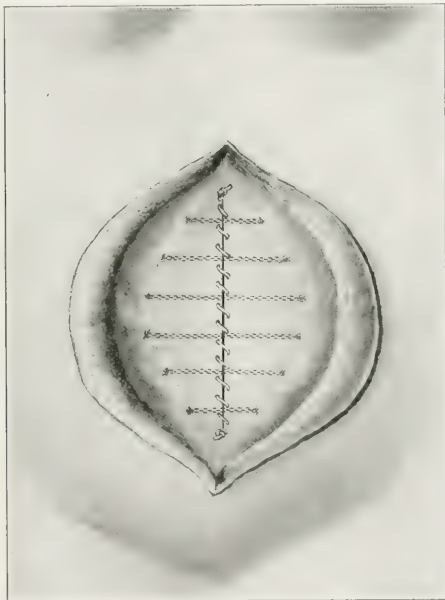


FIG. 4.—A method of reinforcing the anterior abdominal wall by transverse strands of silver chain fastened in position by catgut or fine silver-wire sutures. This method is considered inferior to a continuous-chain suture.

silver filigree may be successfully buried even in the infected wound. This is not invariably true, for we have at the present time a patient into whose abdominal wall a large silver filigree was imbedded in the presence of an eczema of the skin, and we have found it necessary from time to time to withdraw bits of the silver wire from the sinuses

that have formed. It is true, however, that silver wire often becomes imbedded despite the presence of infection, and the same may likewise be said of silver chain. In a girl of about eighteen, who had had upon shipboard a large drainage incision for purulent appendicitis, we attempted to reinforce the hernial closure at a second operation by several transverse strands of silver chain. Suppuration of

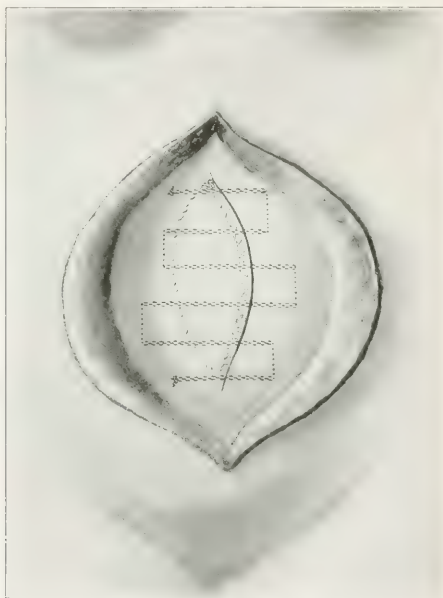


FIG. 5.—Illustrates the simplest and the usually preferred method of reinforcing the anterior abdominal wall by a continuous right-angled suture of buried silver chain. The chain is readily carried through the tissues by being attached to a round needle. The ends of the chain are fastened to the aponeurosis by a fine silver wire or chromic-catgut suture.

the subcutaneous fat, necessitating drainage, occurred, and through the drainage incision one or two strands of silver chain were withdrawn. The wound later closed and an x-ray shows the presence of a crumpled mass of chain that has been retained in the abdominal wall with no sign of irritation.

An especial advantage of the silver chain is the fact that it is adapted for any size of defect and that it may be as quickly intro-



FIG. 6.—Illustrating the support of the sutured deeper layers of the anterior abdominal wall by the implantation of a coarse mesh of fine silver chain. The smaller pictures show two methods of fastening the loose ends of the chain.

duced as a strand of catgut or silk. The terminal link of the chain is tied to the eye of a suitable round-pointed needle by a loop of silk or linen thread, and if the needle has a size equal to that of the

chain, it will be found that the chain slips through the tissues almost as readily as does catgut. As it is threaded through the tissues and not merely laid or tacked in place, it is not readily displaced, and has a fixation and support which is especially desirable. At first we employed separate strands of chain, each end being sewed or tied in position by a suture of fine chromic catgut as shown in Fig. 4.

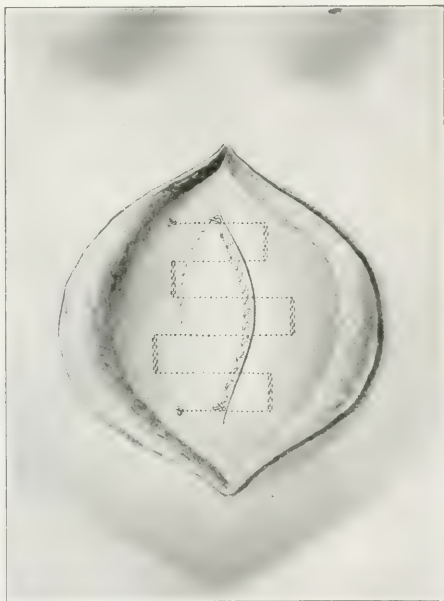


FIG. 7.—Method of reinforcing the anterior abdominal wall by a continuous right-angled suture of fine silver chain. The transverse strands are represented as carried through the muscular substance under the aponeurosis. A previous imbrication has been carried out.

This method we soon abandoned for a continuous lacing suture of chain as shown in Fig. 5. A single piece of chain 5 feet or more in length may be introduced. With the coarser chain the ends are fixed in position by carrying a strand of fine chromic catgut through the terminal links and suturing to the fascia. For the very fine chain through which the catgut cannot readily be threaded, the ends are ligatured to the fascia with fine chromic catgut or silver wire.

Instead of using the chain as a continuous supporting buried suture, the chain may be imbedded in the form of an open mesh as is shown in Fig. 6.

The free ends of the silver mesh may be carried through the tissues by means of a suitable needle and fastened by catgut or united by using a link made of twisted silver wire, or by an open link especially

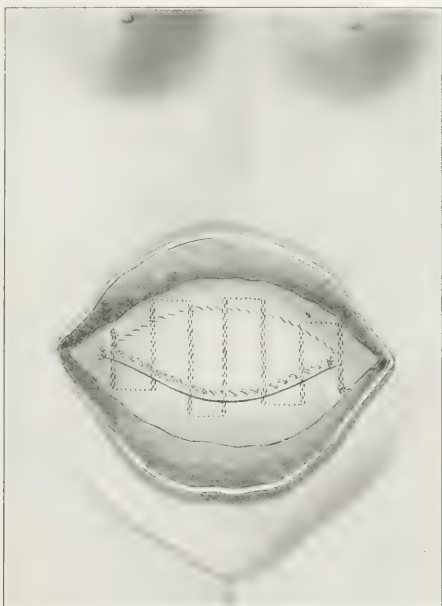


FIG. 8.—Illustrates a method of reinforcing the Mayo operation for umbilical hernia by a continuous right-angled suture of fine silver chain.

supplied for the purpose. The mesh may be made by nearly any jeweler or surgical instrument manufacturer. The cost of the silver chain is from 30 to 50 cents per linear foot, and as for the support of a very large abdominal wall 4 or 5 feet may be required, the average cost should not exceed two dollars for each patient. We usually favor a continuous lacing suture with the chain as shown in Fig. 5 and Fig. 7.

Among other uses for this strong, flexible and nearly nonirritating permanent suture material that suggest themselves, the following are illustrated:

Fig. 8 shows a method of reinforcing the transverse imbrication used in the Mayo operation for umbilical hernia by the insertion of a continuous silver chain.

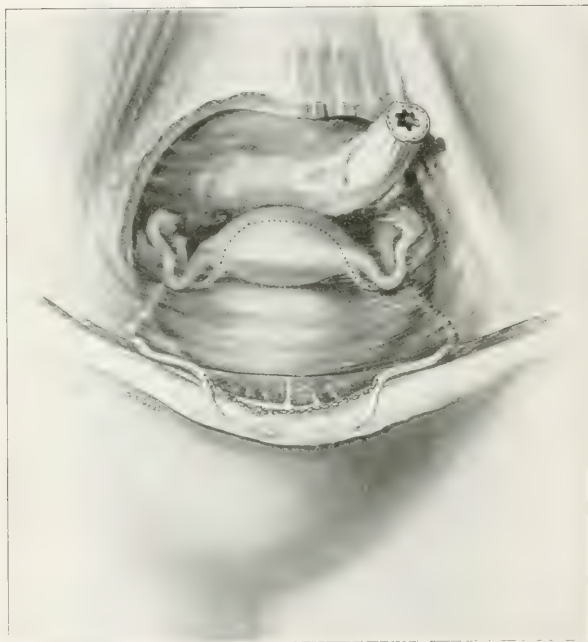


FIG. 9.

Fig. 9 shows a method of threading the chain through the round ligament and wall of the uterus to secure an unyielding uterine support. A similar method with the chain threaded through the cervical or vaginal stump suggests itself as a method of possible value for support in certain operations for procidentia. The peculiar properties of chain may render it of some value in restricting or

fixing the size of certain orifices or canals. Thus the occlusion of the pylorus by one or more loops of silver chain suggests itself as does the constriction of the vaginal canal. A corkscrew implantation of a bit of silver chain may in some more rare cases be of value in the treatment of inguinal hernias, the loops of chain passing through Poupart's ligament and the layers of internal oblique, transversalis,

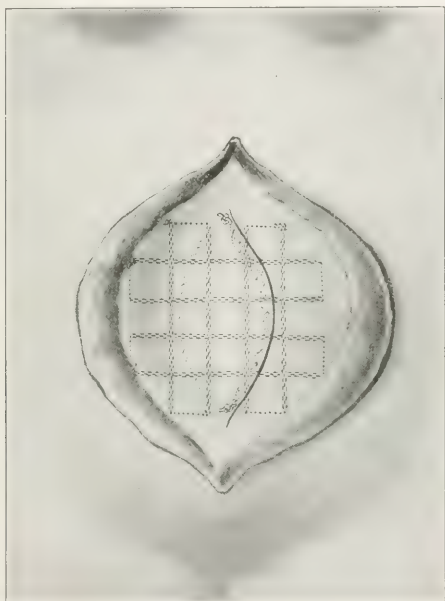


FIG. 10.—A method of reinforcing the anterior abdominal wall by two vertical and two transverse mattress sutures of silver chain. The ends of the sutures are linked together by silver wire or tied together with chromic catgut.

and external oblique, serving to fix the caliber of the internal ring of the canal and of the external ring, and permitting flexibility, without constriction of the spermatic cord. It must, of course, be obvious that like silver filigree, silver chain is not to be considered in the usual simple abdominal operation, but is to be reserved for those cases where the tissues have not of themselves sufficient strength, and where a very flexible and fairly strong permanently

imbedded foreign substance will give the desired support. Fig. 10 shows a method of improvising a mesh by four mattress sutures of silver chain.

Fig. 9 shows another type of lacing suture using a continuous buried silver chain.

In about forty patients operated upon for relaxed abdominal wall, we have removed from $\frac{1}{2}$ to 14 pounds of fat and skin in the

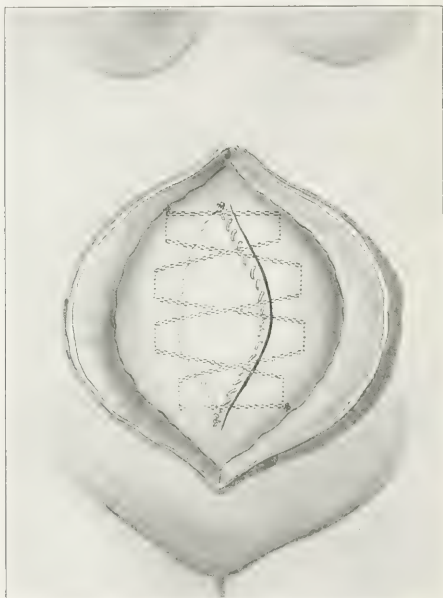


FIG. 11.

reconstruction of the anterior abdominal wall. In association with this operation we have frequently drained or removed the gall-bladder, the appendix, or have performed other abdominal or pelvic operations. We have had one death apparently as a result of heart failure due to the increase of the intraabdominal tension. This patient was an obese middle-aged woman with a weak myocardium, for whom we did an extensive resection of the anterior abdominal wall and probably produced an excessive imbrication of the

deeper layers. She died three or four days after the operation apparently as a result of cardiac embarrassment, due to great intraabdominal tension, the condition resembling that seen after reduction of enormous hernias. A second patient, already mentioned, developed secondary intestinal obstruction following the operation, apparently due to the tension upon certain old abdominal adhesions which on account of their extent and the patient's condition were not freely separated. A third untoward effect that we believe to be due to increase in the intraabdominal tension was a transient glycosuria with a tendency to diabetic coma noted in two patients. Both of these patients were very obese and had had extensive lipectomies performed. Both patients were given large doses of alkalis, and the glycosuria and somnolence gradually disappeared. We have considered this condition as possibly due to interference with the function of the pancreas.

Type of Lipectomy Performed.—In our earlier cases we usually removed an ellipse of fat and skin with its long diameter transverse. This form of incision tended to increase the already large waist measure and often left unsightly projecting folds of skin above the iliac crests, so that it seemed desirable at times to also remove two small vertical ellipses of skin near the ends of the transverse incision. A much better abdominal contour may be obtained by removing a vertical ellipse of skin and using a vertical line of closure. The shape of the ellipse may be so altered as to best contour the waist and upper pelvis. The skin is usually widely undercut to remove as large an amount of the subcutaneous fat as possible. Despite the very extensive separation of tissue layers we have not employed drainage in any of our cases except where this was necessary on account of drainage for biliary surgery. The aponeurotic and muscular layers are closed with chromicized catgut, and the skin with interrupted relaxation sutures of silk-worm gut, usually employed in association with a fine continuous dermal suture.

2033 WALNUT STREET.

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A. UTEROSCOPIC FINDINGS: A PRELIMINARY REPORT.
B. COLLECTION OF UTERINE SCRAPINGS.

BY

ALFRED HEINEBERG, P. D., M. D.,

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(With two illustrations.)

VISUAL examination of the cavity of the uterus *in vivo* presents certain advantages which should commend it to our consideration. It is not proposed as a method to supplant those generally employed by us to determine pathologic conditions within the uterus, but rather as an adjunct to assist in the rapidity and precision with which such conditions may be recognized.

The inspection of a lesion in its natural environs assists us in determining its location, its extent, its relation to the surrounding structures and the condition of the contiguous area. Few of these features may be as easily and surely ascertained by digital exploration of the uterine cavity or by histologic examination of uterine scrapings.

Uteroscopy finds its greatest field of usefulness in discovering the causes of pathologic uterine hemorrhage. It would seem to be a distinct step forward to be able to determine by prompt and simple means whether the causes of such hemorrhage are serious or insignificant. Thus we may be properly guided in the application of measures of treatment, avoiding the employment of drastic methods when simple and safe ones would suffice. Through use of the uteroscope which I devised and described(1) two years ago I am able to present the following data concerning some uterine lesions whose chief symptom is irregular hemorrhage. In a previous communication I described the normal appearance of the inner walls of the uterus as follows: The mucous lining of the body of the uterus is dark red in color and of a velvety appearance. It bleeds easily, when subjected to even slight trauma. After complete dilation (to 46 French) the internal os contracts again quickly, and, on gradually withdrawing the uteroscope, can be distinctly observed as a narrow gateway between the cavities of the corpus uteri and the cervix.

The color of the mucous membrane of the cervix varies from yellowish to pinkish, according to the degree of congestion in the

small blood-vessels, which latter can sometimes be distinguished. The arbor vitæ arrangement of the mucous membrane in cervixes which are not badly lacerated is readily observed.

The pathological conditions of the endometrium which I have studied present the following features:

1. In chronic interstitial endometritis of the hemorrhagic type the uterine mucosa appears thinner, paler and less velvety.

2. In chronic glandular endometritis especially that associated with polypoid degeneration the mucosa is thicker, paler and distinctly shaggy in appearance. The shagginess is made up of small villous and polypoid masses which appear more distinct if viewed while the irrigating fluid is running into the uterus cavity.

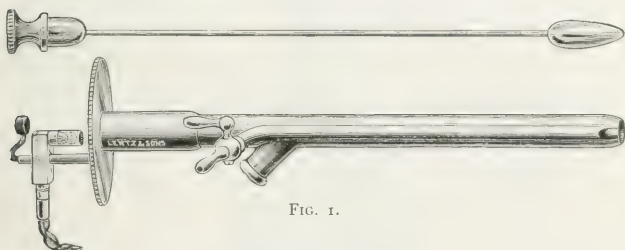


FIG. 1.

3. Isolated mucous polyps have about the same color as the normal mucosa and may present small dark areas of hemorrhage (though this is rare). They engage in the opening of the uteroscope and may be seen to move in the irrigating stream. Their point of attachment is readily determined so that their complete removal with a curet is assured without necessarily disturbing the rest of the mucosa.

4. Carcinoma of the corpus uteri. I have had the opportunity of examining only one case. It was one of the diffused type and had not undergone much degeneration. It presented itself as many irregular, pale, yellowish and pink polypoid masses which filled the cavity of the uterus. The features which seemed to distinguish it from diffuse polypoid endometritis were the greater friability of the mass and more profuse bleeding when pieces of it were broken off with the end of the uteroscope.

5. Chorionepithelioma of which I have examined one case, is the only condition in the wall of the uterus which is distinguished as circumscribed, *bright red tumor*.

6. Incomplete abortion: Retained products of conception produce a very characteristic condition. They consist of irregular masses of varying size closely adherent to the uterine wall, usually near the fundus. The distinctive characteristic of the mass is its mottled surface, on which yellowish areas are irregularly interwoven with dark red or bluish-red areas, where the blood clot had adhered. No other condition which I have observed within the uterus has produced such an appearance.

THE collection of scrapings from the uterus by most of the methods in vogue is a more or less uncertain procedure. If a non-flushing



FIG. 2.

spoon curet be used it may fail to remove from the uterine cavity particles of mucous membrane or neoplastic tissue which have been detached from the wall of the uterus. If a flushing curet be employed it is difficult to prevent some or, at times, all of the detached tissue from escaping into the bucket with the douche fluid. From the standpoint of diagnosis it is important that no portion of the scrapings should be lost, consequently only that method which insures the collection of every particle may be accounted a complete success.

The employment of the speculum and sieve here illustrated insures that success.

The distinctive features of the apparatus are: (1) A sieve, the bottom of which forms a cup which is detachable, (2) a speculum with an obtuse angle which directs the fluid (conveying the scrapings) with certainty from the uterus to the sieve. When the scrapings have been collected in the sieve they may be easily washed free from blood clot, and after detaching the cup, they may be readily examined and transferred to another container.

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1642 PINE STREET.

EXAMINATION OF SEMEN WITH SPECIAL REFERENCE TO ITS GYNECOLOGICAL ASPECTS.*

BY

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Brooklyn, N. Y.

(With ten illustrations.)

THE frequency with which male sterility results from the lesser degrees of seminal defect is not realized; nor are the pathological conditions of the semen upon which sterility depends well understood. Proof of this is found in a review of the literature, which is very scant on this subject, especially in this country where the examination and study of semen has been much neglected. This may have been due, in part, to the unpleasant nature of the work, but more particularly to the difficulty encountered in securing properly collected specimens for examination. While always eager to claim his share of glory in the production of his offspring, a man is most reluctant to share any suspicion of responsibility for failure. In this feeling he has always been sustained by the attitude of the physician. Undoubtedly the mind of the medical profession has been prejudiced; and the study of this subject has been seriously handicapped by the almost universal assumption on the part of the laity that in the event of a childless marriage the wife is wholly responsible.

It is not difficult to understand why such an erroneous impression has prevailed so long. In the male, ability to copulate and the

* Read by invitation before the New York Academy of Medicine, April 25, 1916.

normal ejaculation of semen are regarded as sufficient evidence of his power to procreate; while in the female, the process of ovulation is an obscure one and therefore more readily suspected to be at fault.

It is significant that the more study and observation this subject receives, the higher is placed the percentage of male sterility. Two decades ago Matthews Duncan said, in a lecture on sterility, "Enlarged experience and inquiry make me more and more convinced of the greatness of the part played by the male." In countries where venereal diseases are more prevalent than they are here, observers have placed the proportion of cases in which the male is at fault at a surprisingly high figure. Thus Vedeler, of Christiania, reports that 70 per cent. of the childless marriages he investigated were due to the husband; while Kehrer reports a series of cases in which he found the male responsible in 40 per cent. These figures are too high for general acceptance. Most American writers place the male responsibility at from 15 per cent. to 25 per cent. I believe this to be a too conservative estimate. In cases of absolute sterility, the number in which the husband is at fault must be high at least one in three, for the sexual hygiene of the woman before marriage is usually better than that of her mate, and there is no real evidence to prove that the physiological processes involved in the production and delivery of the healthy ovum are more complicated or less often successful than is the secretion and emission of normal semen.

But at the present time it still seems advisable to seek first the cause of a sterile marriage in the female. *It must be stated, however, that to conduct long and exhaustive gynecological treatment and ultimately to offer a hopeless prognosis without having investigated the reproductive powers of the husband is neither fair nor scientific.* The opportunity to secure the semen for examination presents itself oftenest to the gynecologist and he should be equipped to make this examination as a routine part of the investigation of sterility. From such a viewpoint this study is contributed.

J. Marion Sims reasoned far in advance of his colleagues when in 1869 he wrote: "I insist that we have no right to perform any operation or to institute any treatment whatsoever solely with a view to the cure of sterility until we have settled the three propositions, above laid down, touching the presence and vitality of the spermatozoa." The propositions referred to were: (a) We must be sure that we have semen with spermatozoa; (b) we must ascertain if the spermatozoa enter the uterocervical canal; (c) we must determine whether the secretions of this canal are favorable or not to the vitality of the spermatozoa.

To-day, with superior opportunities for study at hand, we have no right to consider the study of the semen completed when we have demonstrated singly the presence or absence of active cellular bodies. Determination of the activity of the spermatozoa is not sufficient to assure us of their power to impregnate the ovum, neither is the absence of motion an infallible sign of their impotency. In general, the fertility of the semen depends upon the presence of:

1. Mature living spermatozoa (normal cells).
2. A normal secretion (liquor seminis) to convey the spermatozoa to the vagina and to maintain the vitality of the cells until such time as they may meet the ovum.



FIG. 1.

Finger and Saenger have divided male sterility into two groups: *impotentia cœcundi* and *impotentia generandi*. Our subject pertains only to those conditions belonging to the second group, and will be confined to a consideration of the pathological conditions found in the semen, their etiology, and their treatment. Aspermia and conditions resulting from genital deformities will not be touched upon.

Method of Obtaining and Examining the Specimen.—In order to determine accurately the viability of the spermatozoa and the impregnating power of the semen great care must be exercised in preserving the specimen *en route* to the microscope. The most satisfactory arrangement for an examination is made by conveying the necessary implements to the home of the patient and making the observations immediately after conclusion of intercourse. The instructions here given apply more particularly to office observations.

The patient provides himself with the following articles: condoms, a wide-mouthed bottle like a vaseline bottle, and a jar which may be made water tight (Fig. 1). Upon the morning when the examination is to be made the doctor should be notified so that he may be prepared to work promptly. The specimen should be secured after three or four days of sexual rest. After intercourse the condom containing the specimen is placed in the wide-mouthed bottle and this is carefully corked. The bottle containing the condom should then

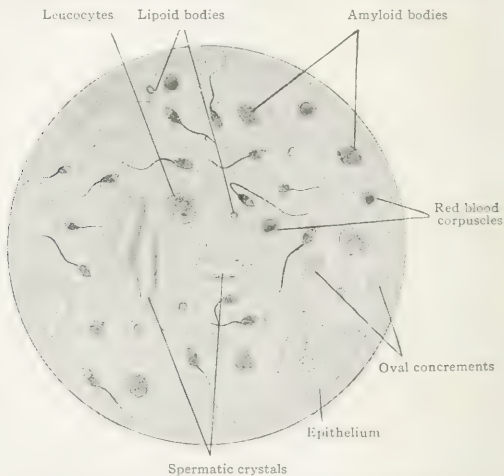


FIG. 2.—Elements which may be found in microscopical examination of the semen.

be placed in the jar which should contain water a few degrees warmer than body temperature. The jar is then immediately taken to the office of the physician. These precautions are necessary to maintain the warmth of the specimen. (If this method is refused by the husband, the semen may be secured from the genital tract of the wife who places a tampon after intercourse and reports at once to the doctor. Under the latter condition a normal finding only is of value as so many elements may enter to affect the condition of the specimen.)*

* Dickinson has developed the ingenious scheme of having the condom placed in the vagina and held there by the insertion of a tampon. The wife then comes to the office and the condom is removed and the examination proceeds. While this method assures the warmth of the specimen, the technic is not as readily carried out and is objectionable to some.

Upon delivery at the office, the bottle containing the specimen is removed from the jar and placed in a warm—but not—a hot bath. The examination should begin at once. The base of the condom is opened with scissors and the specimen is allowed to escape into a dry bottle or warm test-tube; the total amount of the specimen, the reaction, and the amount of sediment should all be noted. Also the temperature should be observed as well as the time that has

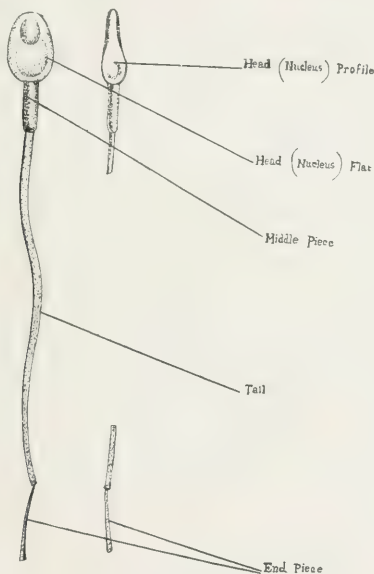


FIG. 3.—B. Human spermatozoa. (Retzius.)

elapsed since coitus. After remarking the gross appearance of the specimen, a drop of the semen is spread upon a warm slide, in very much the same way that is used for urine sediment, and examined with a high power lens. In this manner the best general and detailed study of the efficiency of the semen may be made (Fig. 2). I say this advisedly after trying the ordinary staining methods and the dark field apparatus.

If the semen is normal, and the instructions for its collection have been carefully carried out, the microscope will demonstrate a field

filled with active spermatozoa of fairly uniform size, shape, and activity (Figs. 3 and 4). If, however, the sediment is greatly reduced in amount and the microscope shows a diminution in the number of spermatozoa, or sluggishness and lack of motion, early crystal formation, or presence of pus the specimen is probably defective.

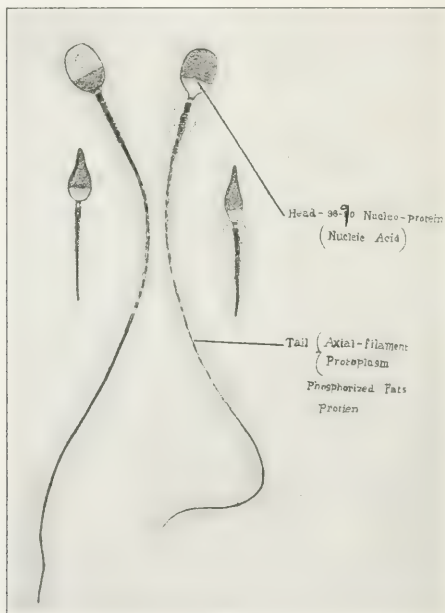


FIG. 3 A.—Human spermatozoa on the flat and in profile. (Bramman, from Schaffer.)

Under such conditions a more detailed examination must proceed. The sediment is covered with the thinnest cover-glass and examined with the oil immersion lens.

Semen devoid of its cellular elements is thin and usually coagulates rapidly, while the sediment, which normally constitutes two-thirds of the discharge, is very slight. The early formation of crystals is reported to denote a decrease in the number or the entire absence of spermatozoa. This commonly accepted sign, I have been

unable to confirm. These spermatic crystals, which are sometimes called after Boettcher who, with Van Deen, was the first to recognize them, are rhombic transparent bodies easily discerned under the microscope (Fig. 2). Fürbringer has demonstrated that such crystals occur exclusively in the prostatic secretion and indicate functional activity of that gland.

Ultzmann* describes the following varieties of semen in which spermatozoa are not found or are greatly reduced in number: (a)



FIG. 4.—Normal forms and modifications of apparent importance.

Watery transparent semen, which is normal in amount but contains slight sediment and in which crystal formation begins early; (b) colloid semen, that is semen containing epithelium which has undergone colloid degeneration; (c) purulent semen.

* If it should be desirable to stain a specimen the following method may be used. I quote from the book of Greene-Brooks: "The specimen may be spread upon a slide and fixed by heat, or by means of methyl alcohol, formalin 10 per cent., or alcohol. Slides so prepared may be stained by practically any of the chromatic dyes of which methylene blue, fuchsin, or gentian violet are best. When a slightly preparation is desired the specimen may be stained by Boehmer's hematoxylin and counterstained by eosin." Full directions are also found in an article by Martin, Carnett, Levi and Pennington, Univ. of Penna. Bull., March, 1902, p. 2.

After some practice variations from the normal will be readily noticed and their importance properly appreciated. A normal finding is conclusive, but if a pathological condition is present findings should be confirmed by subsequent examinations.

Etiology.—The most common cause of sterility in the male was formerly attributed to the absence of spermatozoa in the semen. Kehr found this the cause in 21.3 per cent. of his cases. While many cases of azoospermia have been reported for which no cause was assigned, it is doubtful whether idiopathic azoospermia occurs. Hirtz reported two cases which he considered idiopathic but which have not been so accepted by subsequent investigators. The commonest cause of azoospermia is gonorrhea. In a very large proportion of cases this condition results from a unilateral or, more often, a bilateral epididymitis. One of the most valuable contributions to our knowledge of the part played by gonorrhea in sterility was made by Benzler, a German army surgeon. He was able to follow the history of 473 of his patients who afterward married. Of those with simple gonorrhea, 10 per cent. were childless; while 23.4 per cent. of those with unilateral epididymitis and 41.7 per cent. of those with both epididymes involved were without children. These findings have been generally corroborated. A few authorities, however, believe that gonorrhea is not so often a cause of azoospermia as these figures would indicate.

Another cause sometimes responsible for the disappearance of spermatozoa from the semen is exhaustion due to abnormal demands upon the sexual organs. In these cases the absence of the sperm cells is only temporary and the condition is classified as physiological azoospermia. Gross states that nervous exhaustion alters the character of the semen by causing perverted enervation of the sexual organs. It would seem that neurasthenia and the other neuroses which are prominent features of these cases and which are sometimes considered causative factors, are more often symptomatic, being, in common with azoospermia, a result of intemperate sexual habits. In a more recent contribution to the literature, Hoppe affirms that derangements of the nervous system cause sterility in the male only in those cases classed as impotentia cœundi with which our subject is not to be confused.

In modern times the x-ray has figured prominently as a cause of azoospermia. While it may yet be too early to state positively, those qualified to express an opinion believe that the x-ray is not likely to produce permanent sterility.

There is no question that the importance of syphilis and tubercu-

losis as causes of sterility was exaggerated by the early writers. In the work of Bangs-Hardway the statement is made that except as it causes cachexia or destroys the testes, it is doubtful whether syphilis influences the condition of the semen. Heidingsfeld, who reviewed the literature of this subject, and especially the work of Lewin and Hanc, beside making personal observations, is of the same opinion. The relation of tuberculosis to anomalies of the semen is a subject in regard to which widely different views are entertained. Not unlike syphilis, when tubercular processes attack the genitals or when the terminal cachexia is present, azoospermia results. It has been conclusively proved, however, by thorough investigations quoted at length by Gross that the semen of consumptives contains spermatozoa quite as frequently as that of normal persons. Great weakness occurring in the course of any chronic disease may result in impotency, and Hagner states, with reason, that the virility of the spermatozoa is often in direct proportion to the general physical condition of the patient.

Simonds examined the semen of several alcoholics at autopsy, and obtained results which led him to believe that in chronic alcoholics the function of the testes was at times suspended. In these cases the condition was apparently dependent upon a fatty degeneration of the testes.

Cases have been reported which would seem to indicate that the immoderate use of tobacco occasionally causes sterility. Such views were held by Peyer, Hanc, and Curling. It is reasonable to suppose that tobacco, like morphine and other sedatives, might, after a time, cause impotency by deranging the nervous mechanism of the sexual organs, but it seems highly improbable that it exercises any deleterious effect upon the production of spermatozoa.

There is little in the literature touching upon obesity as an etiological factor in male sterility. Kisch, who has done considerable work in this line, made frequent examinations of the semen of corpulent persons and reports that he found but few spermatozoa in many of the specimens, and that these were often not motile. He states that in 9 per cent. of his overcorpulent patients spermatozoa were entirely absent from the semen. Just what the pathological condition was that explained the azoospermia is not given.

Immature Cells.—In addition to azoospermia and other gross conditions there are cases in which the fertility of the semen is greatly diminished by immaturity of its fecundating elements (Fig. 7). This condition is indicated by morphological changes in the spermatozoa due to an arrest in their process of evolution. These irreg-

ular types of cells are difficult to classify. The condition as related to azoospermia might, however, be considered an intermediate stage. Accompanying the change in form, it is usual to find the sperm cells reduced in number (oligospermia), and macroscopically the semen assumes more or less the character of that described as azoospermia. If the reduction in the number of cells is marked it is, of course, quickly apparent, if not, an accurate estimation of the productiveness of the semen depends upon the recognition of the imperfect spermatozoon. To facilitate the study of these immature cells, it is well to take a moment to review the cycle of phenomena relating to the evolution of the spermatozoon.

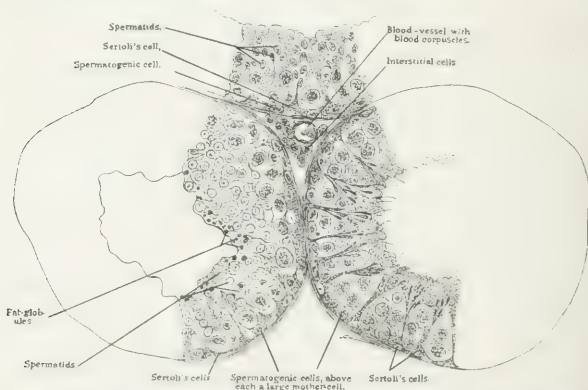


FIG. 5.—Cross-section of seminiferous tubules of a mouse. $\times 360$. Observe that the nuclei of the spermatids (below on the left) at first round, become oval below and are transformed (below on the right) into the heads of the seminal filaments. (Stohr.)

The spermatozoa are formed by a process of division from cells which lie next to the basement membrane of the seminiferous tubules (Figs. 5 and 6). The ancestral (spermatogenic) cells which are naked epithelial cells come, by a process of indirect division, to be large cells which form a layer nearer the lumen of the tubule. These are the mother cells (spermatocytes), each of which, later on in the process, divides twice, thereby forming four cells known as the daughter cells. These daughter cells are really the spermatids or semen cells and are now in a zone still nearer the lumen of the tubule. The nuclei of these cells, which are primarily round, then become oval in shape, while the protoplasm of the cell forms the cau-

dal filament. The cells are then mature and as spermatozoa make up the secretion of the testicle. The semen as ejaculated is composed of the spermatozoa suspended in the secretion of the prostate and accessory glands (liquor seminis). The activity of the sperm cells is not manifested until this union has taken place. The head is the essential fecundating part of the cell. The tail, by the motion of its cilia, executes sinuous movements which result in the well-known

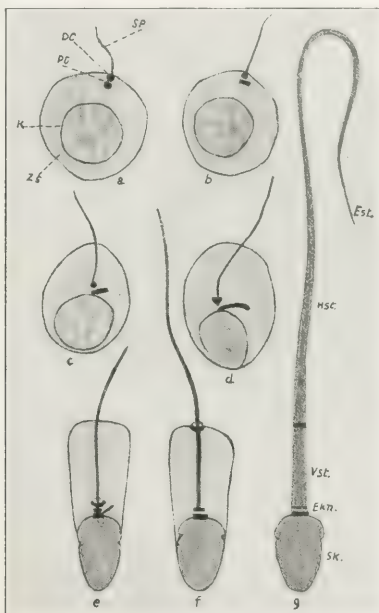


FIG. 6.—Seven stages of the conversion of a spermatid into a spermatozoon. *a* to *f*.—*Zs*, Cell contents; *K*, nucleus; *Pc*, proximal central body; *Dc*, distal central body; *Sp*, tail piece; *G*, head piece; *Ekn*, neck; *Est*, endpiece.

activity of the spermatozoa. Normally this is sufficient to liberate the cell from its medium and carry it to that part of the female reproductive tract where it will meet the ovum.

As stated above many of these irregularly formed spermatozoa are cells which have been cast off in the seminal discharge before they are fully developed. Evidences of immaturity are to be found

in abnormalities of both head and tail. The heads of these immature cells instead of being oval or pyriform, as in the normal specimen (Fig. 7), are round, corresponding in appearance to the nuclei of the spermatogenic cells while in the mother or daughter cell stage of transition. Not infrequently the heads of these cells are much increased in size being usually as large as red corpuscles and occasionally the size of the lymphocyte. The name megacephalic is desig-

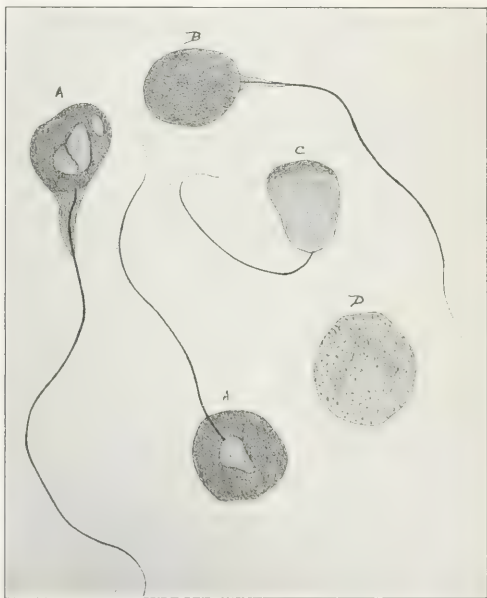


FIG. 7.—Immature types. A, Intermediate stage; B, large round head without nucleus; C, same type with blunt tail; D, leucocyte for comparison of size. Found in defective specimens due sometimes to too great sexual activity.

native of this type of spermatozoon. I have seen cells in which the protoplasm still surrounded the nucleus in ordinary cellular type with an active tail piece of some length. It is unusual, however, to find them deformed. Very often they are short and blunt, or, as occasionally occurs, the caudal extremity may be entirely lacking. These cells are easily recognized if the appearance of normal sperma-

tozoa is kept in mind. The majority of them are motionless and are not viable. Others are active but only for a short time and are probably incapable of impregnating an ovum. The production of these immature cells is an effort on the part of the testes to supply an abnormal demand, and when present, they indicate that the fertility of the semen is much impaired. If the excessive demand continues, azoospermia ultimately develops.

Deformities.—The fecundating power of the semen may be greatly lessened by the presence of many malformed spermatozoa (Fig. 8). Such cases are not rare. These abnormal cells cannot be properly placed under the immature class for they present none of the features peculiar to it. Their occurrence is due either to a functional derangement of the testes or to a degenerative process dependent upon some abnormality of the glandular secretion. In these cases, as in the preceding group, oligospermia is usually very pronounced and but few of the sperm cells are active. Ordinarily no one variety of deformity is peculiar to a given specimen; on the contrary, many different forms of faultily developed spermatozoa will be noticed. For the purpose of classification the deformities of the spermatozoa are best described under two general headings: (a) cephalic deformities; and (b) caudal deformities.

Cephalic Deformities.—A very common abnormality is the reduction in the size of the head. The term microcephalic has been employed to describe these spermatozoa. Such cells are surprisingly numerous in some specimens. Every degree of diminutiveness may be noted. In some instances the head is barely perceptible, appearing as simply a clubbed end of the tail. In these same specimens it is usual to find many caudal extremities with the head entirely absent or not distinguishable under the ordinary lens. Fig. 8 is a drawing taken from a specimen of this kind. At present it seems impossible to determine whether such deformed cells represent faulty development or are due to a degenerative process occurring subsequent to their formation. The fact that in a majority of the cells the tail is apparently fully developed and that in the normal process of evolution the tail is the last part of the cell to be exhibited tends to favor the latter theory. Other deformities of the head characterized by a ragged uneven outline of this extremity are not infrequent. The head of these inert cells may resemble a disintegrating corpuscle, while crescentic and other irregular shapes are not rare.

Caudal Deformities.—In the normal specimen, the tails of the spermatozoa are nearly uniform in size and are very active. Slight

variations in length occur but have little significance if the rest of the cell is normal and active. In defective specimens abnormalities are frequently present in the way the tail joins the head.

Instead of forming one extremity of the cell the head may be at the side of the caudal portion. In other spermatozoa there is a sharp angle in the tail near the cephalic end and sometimes the head and tail are disunited although each portion may in itself appear normal.



FIG. 8.—Headless and tailless forms found in great numbers in some defective specimens. Probably degenerative forms.

Sometimes the tail is rudimentary or entirely absent. In one specimen which I examined the last variety was very numerous (Fig. 8). It seems scarcely necessary to state that these cells with the deformed tails are inactive and unfertile.

Immature and deformed spermatozoa often occur in the same specimen and the extent to which the semen is impaired depends upon: (a) The degree of oligospermia; (b) the percentage of imperfect spermatozoa; (c) the percentage of cells that are motile and their degree of activity—whether sluggish or lively; (d) the length of

time activity persists under favorable conditions. Upon this basis a specimen may be said to be 25 per cent., 50 per cent. or 100 per cent. efficient; or it may be classified as sterile, poor, fair, or vigorous.

I have noticed the double-headed and multiple-tailed cells (Fig. 9) first described by Maddox and do not believe them to be rare. What their significance may be is not understood but their activity



FIG. 9.—Double-tailed and double-headed forms. Their significance is unknown.

is as pronounced and as continued as in the normal type and I am inclined to believe them potent.

Viability.—Inasmuch as it is not determined definitely at what time the ovum is freed from the ovary, and in view of the physiology of ovulation it is obvious that the successful completion of the process of fecundation requires that the spermatozoa shall not only have the power to migrate to the interior of the uterus or tube, but that their vitality must be sustained until the ovum is presented. To this

end Nature produces thousands of fecundating cells that one may survive to perform its complete function.

While it is known that the testes furnish the fecundating elements of the semen, it is likewise important that we should recognize the complementary action of the seminal fluid. In addition to furnishing a vehicle for the spermatozoa, it contains properties that are essential to their vitality. As early as 1871 Kraus showed that in the absence of the prostatic fluid the spermatozoa would not live in the uterine mucous membrane. Later on Sims made the same observation.

Under normal conditions the vitality of the spermatozoa is remarkable. Gross, in discussing the microscopical examination of the semen, says that their motion should continue or be capable of being reestablished for twelve hours. To state an arbitrary time is impossible, but we know that if proper conditions are afforded their motion continues much longer than this. Various references as to the duration of their motion are found in the literature (Biegel). It may be stated, first, that in their proper medium and at the body temperature the viability of the sperm cells may extend over a period of a few days; second, that their prolonged vitality is probably dependent upon the normal lime salts of the prostatic fluid, third, that the sustaining power of the seminal fluid is increased by its union with the normal secretion of the female genital tract.

The spermatozoa are, however, extremely sensitive. I have found that they perish promptly in tap water and in faint lactic acid mediums or under other minor changes in their environment. In the same study it was found that the sperm cells were adversely influenced by increased acidity of the vaginal secretions or by alterations in the cervical secretions. But normally these secretions are bactericidal and act as a chemical stimulant attracting sperm cell to cervix.

I have been much interested in an experiment made recently in which two specimens were obtained simultaneously. One was taken directly from the male, the other from the vagina where it was mixed with the secretions incident to normal intercourse. This revealed that while the specimen taken directly appeared poor it showed an exaggerated activity when mixed with the vaginal secretions. Such an experience suggests that to make our study thorough we must not neglect to determine the degree of physiological affinity existing between the male and female secretions.

One of the less common forms of seminal defect is that resulting from too great density of the semen. The spermatozoa being com-

posed of suspended bodies, their activity is naturally inhibited by any abnormal increase in the specific gravity of the seminal fluid. Such a specimen when placed under the microscope shows normal cells but their motion is sluggish and of short duration or entirely suspended. If, to such a specimen, a few drops of normal saline solution be added the cells will at once become active. If they fail to do so they are probably no longer viable. Similar conditions may be found where an altered state of the prostatic secretion causes an increased coagulability of the semen. Here, as in the former condition,

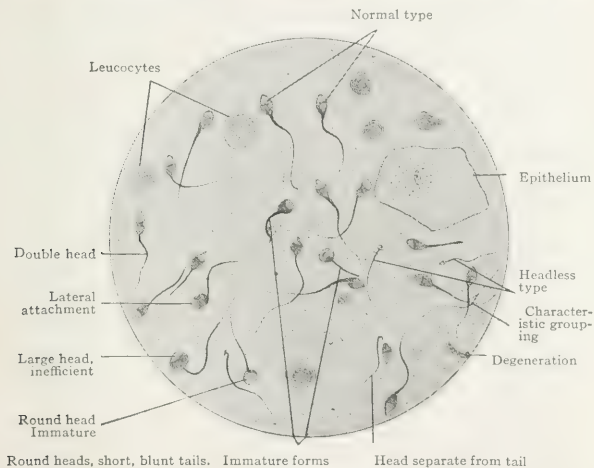


FIG. 10.—Defective specimen sketched two hours after emission; well preserved. Thin and little sediment. Total number of spermatozoa reduced; one in three active. Deformed, immature, and degenerate forms.

the semen, soon after deposit in the vagina, becomes a gelatinous mass from which the spermatozoa are unable to escape. Leigois, in one of his cases which is often quoted, believing this condition to explain the sterility of a patient ordered that coitus should be followed by an injection of saline solution into the vagina, and pregnancy actually resulted.

Of still rarer occurrence are those cases where the fertilizing elements of the semen are destroyed by the presence of pus and blood in the seminal fluid. These foreign substances are found in the semen in inflammations of the epididymes, the seminal vesicles, the

vas, and the prostate. The available data justify the assertion that pus is destructive to the evolution and life of the sperm cells, and probably explains in part the sterility of women who suffer from endocervicitis and endometritis. Sims states that catarrhal conditions of the cervix cause sterility by increasing the density of the semen rather than by any chemical action. A tenacious mucous plug is often found in the cervical canal of sterile women, mechanically obstructing the entrance of the semen.

There is some difference of opinion in regard to the injurious effect blood exerts upon the seminal elements. My observations confirm those of Robin who demonstrated that spermatozoa would live four or five hours in blood, while Dieu showed that when blood had mixed for some time with the contents of the seminal vesicles, the sperm cells were reduced in number or entirely absent. The findings of these investigators represent the opinion now generally accepted, which is that while blood in the semen exercises a very harmful effect upon the vitality and fecundating powers of the spermatozoa the semen must, however, have contained the blood for some time before such changes are produced. It is evident, therefore, that hemorrhage within the seminal vesicles would be the only way in which blood could affect the virility of the semen before emission. In instances where blood appears as one of the elements of inflammation destruction of the spermatozoa occurs because of toxicity.

Treatment.—The treatment of male sterility has been less studied and has received less attention in the literature than any other part of the subject. This may be explained by the fact that the major part of the investigation of these cases has been carried on in foreign countries where the treatment of disease does not receive as much attention as the other branches of medical science.

Many of these cases can be helped. Others are hopelessly incurable. The percentage of the favorable cases is large enough, however, to warrant careful study of each case. Unless dependent upon obviously incurable conditions, sterility in the male justifies the same effort in its correction as when it occurs in the female. If success is to be attained, a thorough knowledge of the etiology and pathology of the individual case is imperative.

A comparison of the statistics of other countries with our own demonstrates the important rôle played by venereal disease as an etiological factor in sterility. This at once introduces the subject of prophylaxis, which is much too broad a subject to be taken up in this paper. Suffice it to say, that if it is made possible to educate the mature members of society in this matter as they are being

instructed with regard to tuberculosis, venereal disease would fast decrease and sterile marriages would become a much less common occurrence. Another means of accomplishing much along similar lines would be a disposition on the part of the general practitioner to refer these cases to those qualified by special study to treat them. Prostatitis, epididymitis, and inflammation of the vesicles often result from unskilled treatment or urethritis and are responsible for sterility in no small proportion of cases.

If, after careful study of the pelvic condition of the wife, it be suspected that the cause of the sterility is to be found in the husband, a detailed history must be secured, and much further study of the case is often required before the tentative diagnosis may be confirmed or denied. If by such study it is found that the patient is sterile, classification of the case either under *impotentia cœundi* or *impotentia gênerandi* will not be difficult. The treatment of those conditions of the second group which have been discussed under the foregoing headings will alone be considered here.

A class of cases amenable to treatment is that in which sterility has resulted from too frequent intercourse. Such hygienic errors are at times made by young married people and occasionally they occur later in life. Similiar results may follow excessive sexual indulgence by those who erroneously think that they may thereby increase the likelihood of pregnancy. Very much like these are the cases in which the fertility of the semen is impaired by involuntary emissions and faulty habits. In the conditions cited, the spermatozoa may either be absent or much decreased in number. In the latter event, variously deformed and immature spermatozoa will be present which are fairly characteristic of this class of cases. Motion of the spermatozoa may be suspended or an occasional cell may show activity.

The treatment of these cases consists chiefly in regulating the sexual life, correcting unwholesome habits, or adopting measures to check involuntary seminal loss. A frank, friendly explanation by the family physician will usually be sufficient. When such excesses are stopped the testicles may be relied upon to resume their normal function unless atrophy has occurred.

Sterility due to defective semen may exist in men in whom there is no apparent cause other than a much debilitated condition incident to an overactive business career. Such men are aware that they are exhausting their energy. Evidences of it are obvious in various neuroses and digestive disturbances. It is not difficult to believe that the reproductive system shares in the general depression, and

that similar methods must be adopted in its correction as in the treatment of nervous and digestive disorders. Accordingly a shorter business day is recommended, or a vacation is ordered for the more serious cases. Systematic exercise is prescribed—golf, sailing, swimming, etc., on certain days for a fixed number of hours. In winter fast walking and well-regulated gymnasium work are excellent, while the cold shower and brisk rub which should follow are not the least helpful part of the prescription.

The sexual habits of these patients must be investigated. Drugs play a very small part in the treatment of these conditions. Sometimes tonic treatment is required, while sedatives may be indicated in others. In the treatment of impotency and some forms of sterility, the choice between stimulation and sedative treatment is an important and difficult one. If the reproductive power of these men is to be reestablished, details as to their manner of living must be diligently studied and such changes must be made as are conducive to the betterment of their general health. In excessive smokers, stopping the use of tobacco or restricting its amount may be followed by happy results. In others, the prohibition of alcohol or the interdicting of drugs may be necessary to secure good results.

Some cases of sterility occurring in the overcorpulent may be cured by treatment of the obesity. If it be true that in some cases obesity results from a disturbance of an internal secretion of the testicles and is in that event only a symptom of tissue change in the testes, as is azoospermia, treatment directed to the obesity will be without effect.

Azoospermia resulting from chronic inflammations or exudates due to a remote gonorrhea is very unsatisfactory to treat. A few of these cases will improve and may be cured if placed in the hands of the genitourinary specialist. A cure has been reported as long as two years after a double epididymitis. If the defective state of the semen be dependent upon the presence of pus or other inflammatory elements local treatment directed to the inflammation of the prostate or seminal vesicles may be curative. Azoospermia, when present in patients with a negative venereal history should excite a suspicion of some chronic constitutional disorder. It must not be forgotten that absence of spermatozoa may occur in such rare conditions as cryptorchidism, congenital absence of the testes, congenital deficiencies of the excretory passages, and malignant disease of the genitals. When dependent upon such conditions, except in rare instances, azoospermia is absolute and permanent. Tubercular disease of the testes and syphilitic orchitis render the

prognosis very unfavorable. If the syphilitic condition be diagnosed early, mercury and the iodides may reestablish the spermatogenic power of the testes. Delayed development of the testes does not necessarily produce permanent sterility. Full development with the establishment of normal functions may occur under proper sexual influences.

Summary.—In the study of sterile marriages, to conduct exhaustive gynecological treatment and ultimately to offer a hopeless prognosis without investigating the reproductive powers of the husband is neither fair nor scientific.

Semen examination, by reason of its intimate character and the vital relation which it bears to the general subject of sterility, is best performed by the gynecologist.

Selection of the method of collection and transportation of the specimen to the office of the examiner must be made to suit the individual conditions, with special regard to maintaining the warmth of the specimen and appointment for immediate examination.

Examination is best made with the high power lens. In addition to noting the general physical properties, the determination of efficiency depends on the degree of oligospermia; the percentage of imperfect spermatozoa—whether immature or deformed; the percentage of the cells that are motile—whether sluggish or lively; and finally, the length of time activity persists.

Recent experiments have shown that a specimen obtained directly from the male, which appears to be poor, may reveal an exaggerated activity when obtained from the vagina where it has been mixed with the secretions incident to normal coitus. Such experience suggests that before an unfavorable prognosis can be made complete study must include an inquiry into the physiological affinity of the male and female secretions.

Observations show a direct relation between the vigor of the individual and the potency of the semen.

Treatment is usually a genitourinary problem. A large proportion of cases is improved by measures which better the general health and sexual hygiene. Twenty-five per cent. efficiency warrants artificial impregnation; fifty per cent. efficiency justifies correction of definite pathology in the female.

15 SCHERMERHORN STREET.

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THE WASSERMANN REACTION IN GYNECOLOGY.*

BY

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THE question of syphilis as an etiological factor in the production of organic lesions and functional disorders of the pelvic organs of women has undoubtedly not received the attention it merits. It is true that syphilis has long been mentioned among other dyscrasias as being responsible for amenorrhea, sterility and certain hemorrhagic conditions, but there existed little scientific proof for such assertions. A review of the recent literature of gynecology or syphi-

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lology reveals very few articles bearing upon syphilis of the uterus or adnexa. This subject is, as Chase(1) has well termed it, an unwritten chapter in gynecology. The primary lesion, the chancre, and the secondary lesions or syphilodermata, mucous patches and flat condylomata are seen at times upon the external genitalia, but the lesions of syphilis higher in the genital tract are apparently limited to gummata, of which the few described in recent literature are not all fully substantiated. In view of the universal prevalence and long history of the disease it would seem that more frequent manifestations of its effects would have been observed in the female pelvic organs. There is no doubt that with the discovery of the causative organism, the serum diagnosis and the later chemotherapy syphilis has become a truly modern problem. With such a facile means of diagnosis as the Wassermann reaction at hand the vague and obscure etiology of many medical problems has been solved, and the presence of numerous unrecognized and latent cases of syphilis has been revealed.

As regards the presence of syphilis generally various authors consider from 5 to 20 per cent. of the adult population to be affected. While a clinical examination of the cadet corps at West Point failed to reveal a single case of syphilis, a Wassermann test showed 5 per cent. positive reactions(2). In a group of women equally large and as widely drawn a similar condition might reasonably be expected to exist. Among delinquent women the incidence of syphilis is of course greater. Haines(3) in investigating this condition in 218 delinquent girls, found in forty-two, with an average age of sixteen years, who were sexual offenders, seventeen who had positive reactions. In the Reformatory at Bedford Hills according to Davis(4), 51 per cent. of the inmates were syphilitic. Among 500 delinquent women studied by Sullivan and Spaulding(5), 44 per cent. had positive Wassermann reactions, 242 of the 500 women who were prostitutes, showed 66 per cent. positive reactions, while in 199 who were mentally deficient 61 per cent. had positive reactions. While the average dispensary class includes only a small percentage of women of this type, there is a certain proportion of patients who must be classed as of uncertain morals or who have been exposed to syphilis through conjugal infidelity.

With a view of ascertaining to what extent unsuspected syphilis is present, and of determining what significance a positive reaction might have in gynecological cases a Wassermann test has been made upon the blood of 300 cases, such as might be met in the average gynecological dispensary and ward service, no selection being made

as to the type of lesion present. In two instances reports have been made as to the incidence of syphilis in women attending gynecological clinics. McIlroy(6) from the Royal Infirmary, Glasgow, reports 43 per cent. positive reactions, a surprisingly high figure. Whitney(7) reports 2.3 per cent. positive reactions among the patients in the Women's Clinic at the University of California Hospital during a period of twenty-two months; in all the dispensaries of this hospital during the same time there was an average of 7 per cent. positive reactions. In 110 pregnant women at Halle, Heynemann(8) found nine with unsuspected syphilis as revealed by the Wassermann reaction. The results of our investigation as to social state and race may be seen in Table I. Of the positive reactions summarized in Table I the degree of complement-fixation may be seen in Table II.

TABLE I.—WASSERMANN REACTIONS CLASSIFIED AS REGARDS SOCIAL STATE AND RACE.

Social state and race.	Total examined.	Number positive.	Number negative.	Percentage positive.
Single.....	35	13	42	23.6
Married.....	245	55	190	22.4
Black.....	92	33	59	35.8
White.....	208	35	173	20.2

TABLE II.—DEGREE OF COMPLEMENT-FIXATION IN POSITIVE REACTIONS.

Total	Positive.	Strongly positive.	Moderately positive.	Weakly positive.	Reacted with cholesterinized antigen alone.
300	68 or 22.6 per cent.	36 or 12 per cent.	8 or 2.6 per cent.	24 or 8 per cent.	16 or 5 per cent.

While it is admitted that syphilis is extremely prevalent in the American negro as shown by Lynch(9), yet it is stated by Hazen(10) that there were only 5 per cent. of syphilitics in over 90,000 negroes treated at the Freedman's Hospital in Washington. Keyes(11) has said that while there may be from 5 to 10 per cent. of unsuspected syphilitics as revealed by the Wassermann reaction, the exact composition of this percentage depends upon the technic used, to which might also be added the nature of the community studied.

All reactions here reported were conducted with the following

three extracts (antigens) according to the technic advocated by one of us (Kolmer): (*a*) A cholesterinized alcoholic extract of human heart; (*b*) An alcoholic extract of syphilitic liver; (*c*) An extract of acetone insoluble lipoids from beef heart. These extracts were diluted with normal salt solution and frequently titrated for their anticomplementary, antigenic and hemolytic titers. All antigens were used in doses corresponding to two to four times their antigenic units, these amounts being always at least ten times less than their anticomplementary units. The use of these triple antigens has three advantages: (1) It permits the use of a cholesterinized extract under conditions where any tendency to nonspecific fixation is to be controlled; (2) An antigen may at any time suddenly become anticomplementary and yield false results, whereas by this method the source of error is detected and may be avoided, since it is not dependent upon any one extract; (3) An extensive study of the comparative values of antigens has led to the distinct impression that the lipophilic antibody in different syphilitic serums frequently shows a special affinity for the lipid in a certain plain antigen more than it does for those in another antigen; not infrequently with weakly positive serums if one antigen had been employed, a false negative report would have been rendered, the true reaction being given by the other two antigens. The extreme sensitiveness of the cholesterinized antigens renders it advisable to control them by less sensitive antigens. Complement was furnished by the serum of guinea pigs diluted 1 to 20, and used in doses of 1 c.c. (= 0.05 c.c. undiluted serum); washed sheep corpuscles were made up in a 2.5 per cent. suspension, and used in doses of 1 c.c.; antisheep hemolysis was titrated each day with each complement, serum and corpuscle suspension and used in doses equal to two units; serums were heated to 55° C. for thirty minutes and used in doses of 0.2 c.c. with each antigen. As is usual in complement-fixation tests serum, antigen and hemolytic controls were included. The readings were made immediately after the second period of incubation, the time depending upon the rate of hemolysis of the controls; in this manner the influence of continued hemolysis is obviated and delicate degrees of complement absorption are appreciated (12).

The occurrence of a positive Wassermann reaction in a woman presenting a gynecological lesion may be of considerable significance. A syphilitic as a result of the infection is undoubtedly in a condition of weakened resistance to such invading organisms as the gonococci, and through the impairment of the tissues we would expect malignant processes to make more rapid progress. While the finding of

TABLE III.—WASSERMANN REACTIONS CLASSIFIED AS TO GYNECOLOGICAL CONDITIONS.

Diagnosis	Number	Per cent. positive	Strongly positive	Moderately positive	Weakly positive	Negative	Number positive with cholesterinized antigens alone
Condylomata of perineum.....	2	..	..	..	1	1	
Edema of vulva.....	1	..	1	..	..	..
Infection of vulva.....	1	..	..	..	..	1	
Pruritus of vulva.....	3	..	..	..	..	3	
Atresia of vagina.....	1	..	..	..	..	1	
Gonorrheal vaginitis.....	10	10	..	1	1	17	
Senile vaginitis.....	1	..	..	..	..	1	
Membranous dysmenorrhea....	1	..	..	..	..	1	
Amenorrhea.....	10	50	5	..	..	5	
Menorrhagia.....	10	..	..	..	..	10	
Metrorrhagia.....	15	20	2	..	1	12	1
Hypertrophy of cervix.....	7	..	1	..	1	5	1
Papilloma of cervix.....	1	..	..	..	1	..	
Erosion of cervix.....	1	..	1	..	..	..
Polyp of endometrium.....	1	..	..	..	..	1	
Pathological antelexion of uterus.....	3	..	..	..	..	3	
Retroversion of uterus.....	25	..	1	..	..	24	
Prolapse of uterus.....	6	..	..	..	..	6	
Infantile uterus.....	1	..	..	..	1	..	
Cancer of cervix.....	5	..	..	..	..	5	
Myoma of uterus.....	12	16	2	..	..	10	
Pelvic inflammatory disease....	60	36	9	6	7	38	5
Ovarian cyst.....	6	..	..	..	..	6	
Sterility.....	9	33	2	..	1	6	
Pregnancy.....	40	17	1	1	5	33	4
Abortion.....	31	29	7	..	2	22	2
Stillbirth.....	4	75	2	..	1	1	
Habitual abortion.....	14	43	6	..	..	8	
Eclampsia.....	7	..	1	..	..	6	
Wet-nurse.....	1	..	..	..	..	1	
Appendicitis.....	11	..	1	..	..	10	
Tuberculosis of peritoneum....	1	..	..	..	..	1	
Rectal disease.....	4	50	2	..	..	2	
Ischiorectal abscess.....	1	..	..	..	..	1	
Fecal fistula.....	1	..	..	..	..	1	
Hernia.....	1	..	..	..	..	..
Cholelithiasis.....	1	..	..	..	1	..	1
Neurasthenia, backache.....	2	..	..	..	1	1	1
Gonorrheal arthritis.....	2	..	..	..	..	2	1
Cystitis.....	6	..	..	..	1	5	1
Pathological menopause.....	1	..	..	..	..	1	..
Total.....	330	..	44	8	25	253	16
Duplicates.....	30	..	8	0	1	21	0

a positive reaction in a case of myoma of the uterus might be looked upon as only an intercurrent infection, yet it would have to be con-

sidered as having had, perhaps, some tendency to further impair the the cardiovascular system. On the other hand, in a case of some ulcerative process about the external genitalia a positive reaction would be of material consequence. It is of interest at this point to note that Fisichella(13) reports twenty cases of rodent ulcer of the vulva, in all of which there was a positive Wassermann reaction, and in three cases injected with salvarsan rapid healing occurred.

The proportion of positive reactions in the conditions observed may be seen in the accompanying table. The condylomata perineii studied were of the pointed variety, due most likely to gonorrheal infection. In the case of edema of the vulva, the only demonstrable gynecologic lesion, the urinary findings were negative, the blood pressure normal and diminution of the edema was noted after injections of arseno-benzol. The case of congenital vaginal atresia observed gave a negative reaction. From the social histories in the cases of gonorrheal vaginitis the occurrence of but one moderately positive reaction is surprisingly low. In the ten cases of amenorrhea, where the usual causes as pregnancy, lactation and so on could be ruled out, there were five strongly positive reactions. These all occurred in young women and the most probable direct cause, an anemia, may have been secondary to the syphilitic infection. The cases of profuse menstrual bleeding and of metrorrhagia have been of much interest because of the high proportion of positive reactions in such cases in McIlroys series. In 24 cases of metritis or fibrosis of the uterus, in which metrorrhagia is a prominent symptom, there were 16 positive reactions, and she further found 4 positive reactions in 13 cases diagnosed as uterine hemorrhage. In 16 cases of fibrosis uteri reported by Whitehouse(14) 7 gave a positive reaction. This author has recently made a careful study of the relation of syphilis to this form of metritis and shows that while repeated pregnancies and infections of a septic or gonorrheal nature and arteriosclerosis may occasion fibrosis of the uterus, there are undoubtedly many instances where the lesion has a syphilitic basis. Whitehouse says in conclusion that it is of importance to test by the Wassermann reaction all patients who present the clinical picture of chronic metritis and fibrosis since this may provide the only evidence of the syphilitic nature of the affection.

Chase considers syphilitic endometritis as being the commonest form of uterine syphilis. This may be true, but Frankl(15) is inclined to regard cases of endometritis as not necessarily syphilitic merely because they improve upon antisyphilitic medication. Dysmenorrhea membranacea or exfoliativa may possibly be of a

syphilitic origin. Frankl speaks of the thick-walled blood-vessels with a surrounding zone of small round cells found in the endometrium removed during the interval. The one case we observed gave a negative reaction.

In one case where erosion of the posterior lip of the cervix was present the Wassermann reaction, as well as the gonococcus complement-fixation test, was strongly positive. In this instance the erosion presented no differences in appearance from the ordinary simple erosion and the search for spirochetes in the secretion was negative. Wile and Senear(16) report two cases of chancre of the cervix in fifty cases of early syphilis in women. The lesions differed markedly in appearance and spirochetes were demonstrated in the secretions from each. It is the opinion of these authors that a routine vaginal examination in all cases of early syphilis in women would disclose the primary lesion with greater frequency. Chancres of the cervix quickly resolve due to the moisture and temperature of the vagina and also from the fact that they are less subject to trauma and friction. Kaarsberg(17) has observed two cases of carcinoma of the cervix in syphilitics. In the first the condition was diagnosed as gumma from the appearance and a positive Wassermann reaction. Partial healing was noted under antiluetic treatment, as this did not continue, a test excision was made and examination of the tissue revealed a carcinoma established on an old syphilitic ulcer. The second case was fairly similar, a year after hysterectomy there were no signs of recurrence or metastasis. The Wassermann remained positive, however. Heynemann found three positive reactions in thirty cases of inoperable carcinoma of the cervix. The five cases reported in this series gave negative reactions.

Whether the presence of congenital syphilis is of moment in the hypoplasias of the pelvic organs is a question of interest. Gräfenberg(18) found tangled masses of spirochetes in the uterus of a syphilitic fetus. McIlroy and Heynemann report positive reactions in infantile uteri. In the case we observed there was a weakly positive reaction. In the case of atresia of the vagina the reaction was negative.

In two of the cases of fibroid tumors of the uterus the reactions were positive. Theilhaber(19) has expressed the belief that syphilis may play a part in the genesis of myomata, through the syphilitic alterations in the blood-vessel walls of the uterus. In a series of 228 cases of myomata syphilis was present 11 times. Two of these 11 died following operation, in both instances from cardiovascular conditions which he attributed to the syphilitic infection. Each

of the two cases gave a history of infection and of repeated stillbirths.

In the sixty cases of pelvic inflammatory disease, so grouped as to constitute cases ranging from mild inflammatory processes to actual suppurative lesions, there were nine strongly positive reactions, six moderately positive, and seven weakly positive reactions. The majority of these cases were considered gonorrheal in origin and the occurrence of this proportion of these two venereal diseases together can hardly be considered as out of the ordinary. In several instances where the tubes and ovaries were removed in these cases sections of the tissue have been stained by the Levaditi method. No spirochetes were found. The six cases of ovarian cysts, including one dermoid, gave negative reactions.

Several other conditions which were observed and included, while not strictly gynecological conditions, are not infrequently seen in this branch of practice, and in most instances complicated some gynecological lesion. Thus in one case of appendicitis a syphiloderm was present with a positive reaction. In two cases of stricture of the rectum there were positive reactions. This condition has long been attributed to syphilis, among other factors, but a certain diagnosis of syphilis may be of assistance in directing treatment. In a large number of cases with positive reactions laparotomy has been performed with no tendency to a lack of union of the tissues of the abdominal wall, or of the tissue of the perineum when plastic work was performed. Failure of union or the unaccounted for lack of, or delay in healing after operation in an otherwise clean wound may possibly be due to the presence or effects of syphilis and the Wassermann reaction should be investigated in any such complication.

The clinical history of syphilis in pregnancy is well known and a history of repeated abortions or stillbirths has long been regarded as sufficient indication for the administration of antiluetic medication. In syphilitic women who become pregnant there appears to occur a gradual diminution in the intensity of the disease so that finally apparently healthy children may be born. An interesting reversal of this well-known clinical phenomenon, Kassowitz's rule, is cited by Watson(20). In three successive twin pregnancies in a gypsy woman, progressively more serious manifestations of syphilis were noted in the offspring. The eight members of this family responded positively to the Wassermann reaction. The fertility of syphilitic women is in marked contrast to that of women infected with the gonococcus, in whose case the one child sterility is often presumptive evidence of the nature of the infection. Sterility is not frequent in

syphilitic families. There may be many abortions and stillbirths but the fecundity of the woman is evidently not affected. In 90 syphilitic families Raven(21) found only 8 sterile women, the other 82 had had 350 pregnancies, with 183 living children. In 119 of these 183 living children, eighty-three were pathologic. He observed that if one parent alone was diseased the mortality of the offspring was 37 per cent., while if both were diseased or gave a positive reaction the mortality of the children was 53 per cent. Harmon(22) found 17 per cent. more pregnancies in 150 syphilitic families than in 150 healthy families. This may be explained in part by the frequency of stillbirths and miscarriages in the syphilitics, the short interval between allowing of several ineffectual pregnancies within the same time as would be taken for one full-term pregnancy in a healthy mother. Further, the desire for children may have helped to increase the number of pregnancies.

In so far as abortions are concerned, syphilis has long been regarded as a most important factor. In view of the findings elicited by the Wassermann reaction some change must be made in this teaching. Lachner(23) found only 4 positive reactions in 100 cases of abortion. Weber(24) divided his 67 cases in two groups, 35 occurring before the sixteenth week in which he found no positive Wassermann reactions and no spirochetes in the tissues, and 32 occurring in the fifth, sixth and seventh months in which there were 12 positive reactions and spirochetes were found in 9 specimens. In 300 cases of abortion he found no clinical evidences of syphilis. Harmon found a history of 61 miscarriages in 150 healthy women as compared with 92 in 150 syphilitics. The difference is not sufficient for us to regard syphilis as the most potent cause of the early interruption of pregnancy. In this series we found 7 strongly positive reactions in 31 cases of abortion before the fourth month.

Among the pregnant women there were two positive reactions, of whom one gave a history of infection. Both women, primipara, gave birth to living children, one had received treatment for several months, the other was seen only shortly before delivery. The child of the second woman presented no clinical syphilis and had a negative Wassermann reaction which combination according to Trinchese(25) is the most favorable combination for the child of a syphilitic woman. The recent studies of Williams(26) and Holt(27) reporting 26 and 9 per cent. respectively, of stillbirths as being due to syphilis emphasize the necessity for the early recognition of this condition in pregnancy. Excluding such definite causes as cardiac and hemorrhagic conditions, eclampsia and birth trauma, every stillbirth in the later months of

pregnancy should be regarded as syphilitic until disproved, by negative Wassermann reactions on both parents. In view of the large number of syphilitic stillbirths, the high mortality rate from syphilis in new-born infants, and the declining birth rate in many localities it would seem that a routine Wassermann reaction on pregnant women was as much in place as an examination of the urine or blood-pressure estimations. In the 4 cases presenting themselves shortly after stillbirths there were 2 strongly positive reactions.

Habitual abortions have often been attributed to syphilis. The reported figures of Heynemann show that in 61 such cases 12 to 15 gave either a positive or moderately positive reaction. Weber found 6 positive reactions in 30 cases of repeated abortions. In 25 cases of repeated abortions Olivia(28) found 18 positive reactions, after eliminating 2 cases as being due to uterine displacement, there is a percentage of 64 in which syphilis was the only cause found. In the present series fourteen women gave a history of repeated abortions, of these six had strongly positive reactions. It may be possible that syphilitic changes in the decidua were responsible for the first one or two abortions and the resulting endometrial lesions rather than the syphilitic infection occasioned the succeeding abortions. The Wassermann reaction has also shed new light upon the interpretation of Colles' law. We now know that the majority of mothers of syphilitic children show positive reactions and are really latent syphilitics; in not a few instances tertiary lesions have been known to develop at a later date. In many instances the apparently healthy child of a syphilitic mother that could not be infected by the mother (Profeta's law) has been shown by the Wassermann reaction to be in reality a case of retarded congenital syphilis, and that such children are not immunized during intrauterine life against syphilis as has been believed in past years. Most examples of so-called immunity in syphilis in mother, Colles' law, and child, Profeta's law, are due to the actual presence of spirochetes in the tissues and are really latent infections.

Seven cases of eclampsia came under observation, in one the reaction was positive. This particular case was of interest in that the woman, a para-v, the mother of five children all living and healthy, had eclampsia in the two previous pregnancies. The result of this third successive toxemic pregnancy was a stillbirth, and later the death of the mother. It is to be doubted if the reported positive Wassermann reactions in eclampsia are due to any changes in the blood as a result of the toxemia. It may be that some of the occasional moderately high blood pressures met with in pregnant women

who are evidently not toxemic, are the result of a syphilitic endarteritis. In one instance a wet-nurse presented herself for examination. She gave the interesting history that she had been confined several months previously of a stillborn child, cause not explained and had been engaged immediately to nurse the new-born infant of a woman suffering with pulmonary tuberculosis. While her Wassermann reaction was negative it is in just this type of case that its application is only humanely necessary. Rietschell(29) in testing the wet-nurses in the Dresden "Säuglingsheim" found that 10 per cent. gave a positive reaction, although they showed no clinical evidence of the disease. As it curiously often happens that mothers of luetic children may give a negative reaction it would be advisable to test child as well as mother, before allowing the latter to assume the duties of a wet-nurse.

Of particular interest are the results obtained with the use of cholesterinized extracts as antigen. These extracts originally advocated by Sachs have been shown by Walker and Swift, Kolmer, Field, Thompson, Judd and others to be very sensitive and generally satisfactory.

As pointed out by one of us (Kolmer) these extracts may yield in a small percentage of cases denying syphilis a weak degree of complement-fixation. The sum total of an extensive experience with particular attention to the titration of the antigens has led us to place more and more confidence in the specificity of these reactions. In such a disease as syphilis it is impossible to definitely exclude syphilis on the basis of a negative history and physical examination. Consequently it must be expected that a certain percentage of positive reactions will occur among persons denying syphilis and showing no evidence of the disease at the time of examination. Brief abstracts of the histories of ten of the sixteen cases reacting only with cholesterinized extracts are given here; we are of the opinion that the majority of these may be regarded as suspiciously syphilitic and the reactions with cholesterinized extracts are to be interpreted as true reactions due to the superior antigenic sensitiveness of the cholesterinized extracts.

CASE I.—F., white, aged thirty-eight years, married, three pregnancies, one ended in a miscarriage, the children of the other two pregnancies both dead. Complaints of irregularity of menses. Clinical diagnosis: Hypertrophy of cervix. Serum reaction, weakly positive with cholesterinized antigen alone.

CASE II.—S., negress, aged nineteen years, single, never pregnant. Complaints of genital ulcers and leukorrhea. Clinical diagnosis:

Condylomata acuminata, gonorrheal vaginitis. Serum reaction, weakly positive with cholesterinized antigen alone.

CASE III.—O., white, aged thirty years, married, never pregnant. Denies history of infection. Complains of abdominal pains. Clinical diagnosis: Pelvic adhesions following previous salpingectomy. Serum reaction, weakly positive with cholesterinized antigen alone. Pain subsided under mixed treatment.

CASE IV.—B., negress, aged thirty-two years, married, six pregnancies. First child living, then two miscarriages, three stillbirths. Clinical diagnosis: Pregnancy. Serum reaction, weakly positive with cholesterinized antigen alone. Mixed treatment, living child born at term.

CASE V.—R., white, aged twenty-five years, married, two pregnancies, live children apparently healthy. Complains of jaundice and pain in right upper quadrant of abdomen. Clinical diagnosis: Cholelithiasis. Serum reaction, positive with cholesterinized antigen alone.

CASE VI.—Z., white, aged nineteen years, married, pregnant five months. Reacted with cholesterinized antigen alone. Placed on mixed treatment.

CASE VII.—C., white, aged twenty-seven years, married, four pregnancies. Last two children died shortly after birth. Complains of leukorrhea and dysmenorrhea. Clinical diagnosis: Right adnexal disease. Serum reaction, positive with cholesterinized antigen alone.

CASE VIII.—L., white, aged thirty-two years, married, four pregnancies, resulting in two miscarriages, one stillbirth and finally a living child. Complains of leukorrhea. Clinical diagnosis: hypertrophy of cervix. Serum reacted with cholesterinized antigen alone.

CASE IX.—B., negress, aged thirty years, married, sterile. Complains of hematuria. Clinical diagnosis: Chronic ulcerative cystitis. Serum reacted weakly with cholesterinized antigen alone.

CASE X.—D., white, aged thirty-one years, married, two pregnancies. Both children alive and apparently healthy. Complains of pelvic discomfort and dysmenorrhea. Clinical diagnosis: Adherent retroverted uterus. Serum reacted with cholesterinized antigen alone. Mixed treatment instituted.

SUMMARY.

In this study the Wassermann reactions of three hundred gynecological and obstetrical patients have been investigated. The percentage of positive reactions (22.6) corresponds closely with the generally accepted incidence of syphilis in adults. The incidence of syphilis in gynecology on the basis of the Wassermann reaction is so definite that this disease cannot be excluded on the basis of a negative history and the absence of demonstrable evidences of syphilis; while a particular lesion may not be syphilitic it is, however, highly important to institute antiluetic treatment if syphilis is demonstrated by the Wassermann test.

Of particular interest is the relatively high percentage of positive reactions observed in the following conditions: Stillbirths, 75 per cent.; rectal diseases, 50 per cent.; amenorrhea, 50 per cent.; habitual abortion, 50 per cent.; pelvic inflammatory disease, 36 per cent.; sterility, 33 per cent.; abortion and miscarriage, 29 per cent.; metrorrhagia, 20 per cent.; myomata of the uterus, 16 per cent.; gonorrheal vaginitis, 10 per cent.; pregnancy, 17 per cent.

The social condition has played no part in increasing the percentage of positive reactions in our series; some of the single women were parous, and a number of the married women were sterile. Race, however, seems to be a more important factor, 35.8 per cent. of the black race gave positive reactions as compared with 20.2 per cent. in the white women. The history of infection has been obtained in but a few cases. This is a well-known fact, it is not the intent of the patient to deceive but the primary lesion in women is overlooked and the secondary stage may have been disregarded.

The high degree of latent syphilis in women should make a routine Wassermann test in gynecological and obstetrical practice as advisable as any other laboratory procedure; it is certainly as advisable here as in medical and surgical practice.

The Wassermann reaction under proper conditions has proven highly specific and an indispensable diagnostic aid. Particularly during the child-bearing period treatment should be given; even in latent syphilis where no symptoms are manifest treatment should be given, as according to our present knowledge a persistently positive Wassermann reaction indicates the presence of living spirochetes in the tissues.

In view of the pregnancy of latent syphilis as revealed by the Wassermann reaction in gynecological patients and the scant attention paid to syphilis as an etiological factor in the production of pelvic pathology in women we feel that a routine Wassermann reaction and the subsequent histo-pathologic study of tissues removed from syphilitics may bring more light to bear upon this neglected phase of gynecology.

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121 SOUTH TWENTIETH STREET.

927 SOUTH ST. BERNARD STREET.

CHRONIC FOCAL INFECTION OF THE PELVIC ORGANS AND ITS RELATION TO SYSTEMIC DISEASE.*

BY

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Most internists agree that systemic disease is the result of local infection.

We are all familiar with the assumption that the oral cavity is the greatest portal of entry for microorganisms.

When we consider that the genito-urinary tract is normally the habitat of a large number of bacteria of potential pathogenicity, and furthermore, from its anatomical position, and the changes that occur in connection with the functions of menstruation, of married life, of childbirth, and the menopause, offers the greatest facility for their entrance and growth, it is self-evident, that the reproductive and urinary organs must frequently be the site of septic foci that are not only potentially able, but do produce toxemia, as well as constitutional disease.

Septic infection usually occurs in connection with the puerperal state.

The uterus of labor and abortion contains the necessary pabulum as a starting point of infection. Operative procedures, displacements, fibroids, and gonorrhea all predispose to the condition.

Systemic infection may be direct from the portal of entry in the genital tract (the placental site usually) or from a secondary area in the contiguous structures (thrombophlebitis or lymphangitis). Depending upon the virulency of the organism or organisms, it may be severe or mild. The infection may subside, and leave behind a latent focus in the pelvic organs or structures, or a metastatic lesion in other organs or parts of the body. Conversely, the focus

* Read before the Obstetrical Society of Philadelphia, May 4, 1916.

may be chronic from the beginning, a product of former extra-pelvic disease.

A chronic focus of infection may exist for a long period of time, without apparent injury to the host, due, as Rosenow has pointed out, to the modification which the organisms may undergo in known mutation of cultural characteristics and pathogenicity.

As this is probably influenced by the local blood supply and oxygen content of the infected tissue, later with the defenses of the body diminished by overwork, dissipation, exposure to cold, insufficient or improper food, faulty hygiene, injuries from previous disease, trauma, etc., the infection may again become active and the individual suffer from an acute or a chronic arthritis, myositis, malignant or simple endocarditis, pneumonia, etc., dependent upon the phase of mutation in pathogenicity of the specific strain of the streptococcus-pneumococcus group in the local focus.

Clinically these cases are often of a baffling character and the utmost skill and care is required to associate the constitutional disease with the focal sepsis. The structures and organs having long since assumed their normal condition, the focus may not only be extremely small, but so deeply embedded in the substance of the ovary, the parametrium, or in the walls of the uterus, as to make recognition difficult.

Six weeks ago, I saw just such a case of focal sepsis. Mrs. B., aged forty-eight years, married, multipara. Last menstrual period five years ago. Always enjoyed good health.

Since last summer the patient suffered from nervousness, anorexia, tachycardia, anemia and asthenia. Occasionally she had chilly sensations that would last for several hours. During this time she lost 20 pounds in weight. The blood count was 3,920,000 red and 13,360 white cells. Hemoglobin 65. Color index 8. Locally, there was a slight but persistent yellowish discharge from the vagina.

On bimanual examination, the uterus was found to be freely movable, and somewhat enlarged, with an area of induration in the left lateral wall. The cervix appeared to be normal, although, pus discharged from the external os.

At the operation, done March 15, '16 at St. Joseph's Hospital, the uterus which was removed, was free, and covered by an apparently normal peritoneum. The ovaries and tubes were atrophied.

The pathological report stated that the specimen consisted of a uterus, which showed upon its postexternal surface, multiple metastatic abscesses, that ranged in size from a millet seed to a pea. Upon section, the walls of the fundus and lateral parts of the body presented large cavities filled with pus. The cervical mucosa above the external os, showed a small area of erosion, that proved on microscopic investigation to be an adenocarcinoma.

The early recognition of the septic focus in this case was highly essential, when we consider, that the portal of entry was a malignant ulceration. The discharge, the only sign pointing to local disease, was considered of little or no significance almost throughout the entire period of her illness.

When discharged from the hospital, on the last day of the month, the patient was free of symptoms. Her pulse rate, which, prior to the operation, had always been about 120, even with normal temperature was 80 and the leukocyte count 6940.

The colon bacillus a potential part of the bacterial flora, inhabiting the external genitalia, not uncommonly creates a focus that produces systemic infection. Davis in his studies found the colon bacillus in cystitis and pyelitis and that it was also associated with a variety of clinical conditions, including joint lesions, neuritis, anemia, etc. Often the patients were neurasthenics.

Infection of the kidney pelvis occurs more frequently by the way of the lymphatics, blood stream or continuity of tissue from the colon, than by ascension, and as it appears quite unnecessary that the kidney should be either tender or obviously enlarged during the presence of acute symptoms; in the absence of a cystitis there will be so little of a localizing character, that it is quite possible for a focus in this region to sometimes elude diagnosis.

The intestinal tract may be the source of invasion by bacteria, as in typhoid fever, which invade organs or tissue of the pelvic cavity and thus produce a focus from which systemic infection arises after the subsidence of the primary disease. Illustrative of this, LeConte and Lewis, in 1902, reported two cases of typhoid infection of ovarian cysts. It occurred in the fourth and fifth week of the disease, respectively. Following the subsidence of the typhoid symptoms, there was a secondary elevation of temperature, etc., and coincidentally the leukopenia rose to a leukocytosis of 9200 in one, and 10,400 in the other. With incision and drainage of the cyst contents, the septic symptoms and increased number of leukocytes disappeared. Five days later, both patients had a relapse of the typhoid symptoms, without, however, any increase in the number of white blood cells.

These cases are also of interest in demonstrating the value of the blood count in preventing confusion in the diagnosis between typhoid fever, the septic condition, and the reverse.

Under abnormal anatomical conditions of the tract, with stasis of the intestinal contents and sluggish blood circulation, ordinarily innocent bacteria (colon bacillus, streptococcus intestinals, etc.)

may acquire pathogenic properties with resulting local and systemic disturbances of various organs.

Coleman and Hastings have laid stress on the fact that some strains of bacillus coli are capable of producing generalized infections clinically identical with typhoid fever.

During the past summer, I operated upon two (2) such cases. The first patient had been ill for several weeks with symptoms expressive of typhoid fever. At the end of that time, she complained of pain in the right iliac region. A vaginal examination revealed a small mass that proved to be an infected intraligamentary cyst of the right ovary. Here was an example of direct invasion by the colon bacillus, from the sigmoid.

The second woman lived in a community in which there was an epidemic of typhoid fever. The course of her infection mimicked the disease. At the end of the second week, she was seized with a sharp pain in the region of McBurney's point; an accompanying drop of the temperature to below normal with a subsequent rise to a higher level, lead her physician to suspect a typhoid perforation.

The focus in this case also proved to be an ovarian cyst. As the latter was free in the pelvic cavity it is quite likely, that this was an instance of a hematogenous, lymphatic, or ascending infection.

In both of these cases, had blood counts been made, Widal's taken, and vaginal examinations enforced, early correct diagnosis would have been possible.

In all maladies in which there is the slightest suspicion of doubt as to their origin, careful investigation of the pelvic organs should be made a routine practice. Furthermore, in cases of puzzling diagnosis, it should be supplemented by proper studies of the blood, urine and other excretions. Vaccines and serums, if of limited value in therapeutics, are often of real service in helping to determine the etiology of the disease.

In conclusion, I wish to emphasize the probability of the uterine mucosa being a frequent focus of infection in the production of systemic disease. Clinically we cannot limit an inflammation of the uterus to any one tissue. An inflammation of the mucous lining also involves a part of the substance of the organ.

We must furthermore bear in mind that the uterine mucosa is not functionally analogous to other mucous membranes, as many of the processes which we have to describe under endometritis, are more allied to new formations than the inflammations we are accustomed to study in mucous membranes elsewhere; as an example, the glandu-

lar form of endometritis is more akin to an adenoma than to a catarrh of the mucous membrane.

If in fertile women, puerperal sepsis is the most important cause of uterine inflammation, in sterile women, the ravages of the gonococcus are deserving of study. It is a malady which, in its subtle invasion, and its far-reaching effects, requires careful investigation.

The gonorrheal process is for the most part superficial, but it is now well established, that deeper extension does sometimes take place, and that suppuration may occur in the deeper layers.

Gonococci have been found in the periurethral, periovarian, and perirectal connective tissue, and in the subperitoneal lymphatic spaces.

Wertheim has advanced evidence to show the pyogenic powers of the gonococcus itself.

They may remain latent in the uterine mucosa a long time before ascension to the tubes, ovaries, and peritoneum takes place.

McCann has stated that the complications of gonorrhea may be due to the gonococcus, or to other germs mixed with it; or to a secondary infection by other germs which have followed and supplanted the gonococcus; or to the toxic products of the gonococcus, or of other bacteria.

The fact seems to be well established that gonococcal toxin has the power of exciting local and general symptoms.

The effects of the invasion of the female genito-urinary tract by the gonococcus vary, from a limited and transient catarrh, which almost escapes notice, to extensive disease of the pelvic viscera. In the slight cases the woman may not consider that she is ill, still less, that she is a source of infection.

In the cervix and body the gonococcus finds a soil where it can develop freely and where it long maintains its vitality, causing functional disturbances and interfering with health.

The local disturbances may be slight, the discharge being mucopurulent or glairy mucous. The systemic conditions, however, may be the expression of a more or less profound toxemia or gonococcemia.

The former may give rise to backache, headache, gastric disturbances, neuralgia, myalgia, nervousness, mental depression, chronic asthenia, etc. As the result of the latter, constitutional diseases as arthritis, rheumatism, myositis, myocarditis may occur.

I believe that a considerable percentage of that large class of nervous debilitated dyspeptic women, who wander from one medical man to another, seeking relief, are the unconscious possessors of an unrecognized and untreated infectious disease of the uterus.

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2035 CHESTNUT STREET.

REPORT OF A CASE OF KRUKENBERG'S TUMOR OF THE OVARIES.*

BY

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THE unusual type of the tumor in this case has led me to put it in on record. An extensive study of the reported cases has been made by Dr. Outerbridge and recently by Dr. Stone, leaving very little to be gone over in the literature.

June 23, 1915.—Mary McN., aged thirty-nine years. Para-iii; one miscarriage; last child one year ago; no forceps; has had "stitches" after all children but the last. During this pregnancy was badly nauseated from three months' gestation until labor, and her husband states, she has never been free of nausea since.

Nursed this baby four months. Usual weight, 137 pounds; after pelvic operation, 103 pounds.

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Menstruation. Menses at fifteen years; type twenty eight days; three days' duration; two napkins daily. Last menses June 15, 1915. No dysmenorrhea; no leukorrhea; no urinary symptoms; is constipated.

Chief Complaint.—Vomiting. This vomiting began when patient was last pregnant and has kept up since then. Is nauseated and vomits small amounts of liquid, sometimes food, has apparently no other trouble.

P. M. H.—Had the usual diseases of childhood, no other.

Father living and well. Mother died of uremia. Two brothers living and well; two brothers dead, one from tuberculosis. One sister living and well. No history of malignancy, except one aunt who died of some tumor of stomach.

Examination.—Patient seems fairly well nourished. Lungs normal. Breasts, some secretion; abdomen, no palpable mass; heart sounds clear and good rhythm.

Pelvic Examination.—Perineum shows old bilateral laceration, partially healed, some rectocele. Cervix, a bilateral laceration somewhat marked. Uterus slightly larger than normal retroverted.

Both ovaries enlarged, seemingly to size of small lemons, freely movable but tender; no adherent masses. Presumption is then that the tubes are not inflamed, and that perhaps the ovaries are the seat of multiple retention cysts.

We advised repair of tears and an anterior round ligament suspension, with inspection of ovaries.

Operation July 2, 1915. Emmet's repair of perineum. D. & C. Repair of cervix. Abdominal incision, median. Ovaries found free of adhesions, but the seat of a solid tumor, both enlarged to two or three times normal size and giving the appearance of carcinoma.

No other nodules found and in view of our previous operations it was thought best to do a simple double salpingo-oophorectomy, reasoning that such an advanced stage of involvement, if malignant, would mean an exhausting operation in addition to the several already done, to remove all metastases.

Uterus fixed to anterior fascial wall. Appendix removed. Wound closed.

Patient did well. Made an uneventful recovery, and while in the hospital was not much nauseated.

On July 17, 1915, we received the pathologist's report (Dr. D. B. Pfeiffer):

Neoplasm of ovary. Both ovaries microscopically show diffuse infiltration with large round cells, which lie loosely in the interstices of the ovarian stroma, without definite arrangement.

These cells vary somewhat in size and in the stroma reaction. The small cells have a well-defined rounded nucleus and protoplasm take a diffuse pink stain.

The larger cells have an irregular small densely staining nucleus, eccentrically situated; the protoplasm shows a fine reticular structure and does not stain. These cells strongly resemble the so-called foam cells seen in Krukenberg's tumor, which represents the type

of a bilateral ovarian tumor associated often with carcinoma of the stomach. The ovaries are much smaller than commonly seen in this condition, but I believe it is a very early stage of the same.

Scrapings. Uterine musculature without endometrium shows chronic inflammation.

Appendix. Chronic interstitial appendicitis, minor lesions only.

The next day the contents of the stomach analyzed gave the following:

Mrs. Mary McN. July 18, 1915.	Ewald test-meal.
Quantity, 50 c.c.	Occult blood, negative.
Color, pale yellow.	Free HCl, negative.
Odor, sour.	Total acidity, 16.
Reaction, slightly acid	Lactic, negative.
to litmus.	Many fat globules.
Consistency, mucous.	Many starch granules.
Bile, negative.	Oppler-B. Bac.—Neg.

The patient was allowed to go home after a careful explanation had been made to her husband and physician, and we were sure that no palpable tumor existed in the upper abdomen.

Examination of stool for occult blood, negative.

In December of 1915 her physician referred her to me again with the report that after going home the nausea and vomiting of fluid continued unabated, although she had gained slightly in weight.

Basing our judgment upon the previous condition of anacidity, she was placed on dilute HCl, but was not much benefitted. She was then placed upon dilute nitrohydrochloric; seemed very much better; nausea entirely ceased and for a time it seemed as though we had found the solution of the difficulty.

But again, late in January, she returned as much nauseated as ever, and in February was sent to the medical ward of the Presbyterian Hospital for x-ray diagnosis of a small mass now palpable in the region of the pylorus with these findings—epigastric mass size of large egg, tender and some gurgling on pressure.

Weight, 2d mo. 20, 1916, 111 $\frac{1}{4}$; 3/5/16, 111 $\frac{1}{2}$; 3/11/16, 109 $\frac{1}{2}$.

Urine, 1020—1033; acid, trace of albumin, no casts.

Blood, H. 65. Whites, 7450; reds, 3,230,000.

2/21/16. Wassermann, negative.

3/1/16. Stomach contents 92 c.c. pale yellow. Sour, mucous; bile negative. Blood present; free HCl, 6; total acid, 20; starch and fat.

3/13/16. Vomited 170 c.c. colorless liquid; acid, mucous; bile and blood present.

HCl, negative; total acid, 26; few red B. C.

3/5/16. X-ray picture shows a mass involving the entire lesser curvature and the pylorus.

Basing his judgment upon these pictures and a fluoroscopic examination, operation was considered futile by the surgeon on duty. The patient, anxious to get relief from nausea, agreed to go to the Jefferson Hospital, and Dr. Francis T. Stewart made an exploratory

incision, found the entire stomach the seat of a growth, of which he was unable to secure a specimen, and which precluded the possibility of a posterior gastroenterostomy. With difficulty he found enough healthy tissue on the anterior wall to do an anterior gastroenterostomy.

The patient was for a short time relieved of her nausea, but even before leaving the hospital, evinced a slight return.

The pelvis at this operation was digitally explored and found to be the seat of many adhesions and recurrent growth.

No one will ever be able to accurately determine which was the primary growth. Certainly to me the ovaries seem to be so in this case. The early stage, found accidentally, the lack of adhesion, of local extension, the inability at first operation to find any palpable tumor in the region of the stomach, all point to some change in the ovaries excited by the course of pregnancy.

I. IMPACTED TUMOR OF THE PELVIS WITH ACUTE URINARY OBSTRUCTION. II. PELVIC PNEUMOCOCCUS ABSCCESS.*

BY

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THE disastrous effect of compression of the ureters by pelvic growths is not to be forgotten in connection with the question of their removal or nonremoval. The writer reported a case of uremia produced by the wedge-like action of a fibroma of the uterus (*American Medicine*, vol. viii, No. 24, 1914.) He has recently operated upon a deep pelvic growth where the legs were edematous, the pounding headache severe, and the blood pressure 215, apparently due to the above cause, as there was no nephritis and the blood pressure fell to 180 after removal of the pressure from the tumor.

Dilation of the ureters and death from back pressure on the kidneys may be due to the nipping of the ureters by uterine carcinoma. The writer has seen the ureters tortuous and dilated to the size of the finger from this cause. Very rarely partial obstruction from kinking follows pelvic inflammation.

Much more unusual, however, in the writer's experience is any interference with the urethral canal by pressure; because tumors usually do not form low enough in the pelvic outlet to compress the urethra against the pubic bone. The writer has recently recorded in *Surgery, Gynecology and Obstetrics*, a case of obstruction of the

* Read before the Obstetrical Society of Philadelphia, May 4, 1916.

urethra and urinary retention from carcinoma of the urethra itself; but the following is the only instance in his experience in which a pelvic tumor has succeeded in actually shutting it off by external pressure, though it is frequently greatly elongated by traction or contorted.

Mrs. T., aged fifty, para-ii was referred by her physician for acute urinary retention, with chill, fever and very great abdominal distention from a combination of intestinal distention, overfilled bladder and a fixed cystic pelvic tumor. the whole combined with a marked spinal kyphosis which thrust her abdomen forward in a way most embarrassing to the effort at diagnosis and treatment.

Leukocytosis of 48,400. The catheter withdrew 103 ounces, (6½ pints) of urine without diminishing the distention.

The overdistention of the bladder caused muscular paralysis of its walls, and was followed by copious purulent cystitis, with tube casts. However, irrigation and continuous drainage with a Pezzer catheter cleared this up, and abdominal section was performed thirty-six days later under gas—oxygen—ether, in the presence of a bronchitis.

The pelvic growth was a papillary carcinomatous cyst originating deep in the pelvis. The contents were chocolate colored, the solid portion of the cyst wall infiltrated the left broad ligament.

The intestines and parietal peritoneum were studded with millet seed sized tubercles, doubtless of the same nature as the spinal caries which caused the old kyphosis.

The patient regained complete control of her bladder and left the hospital in good condition. At present, seven months later, she goes about freely and her condition is surprisingly comfortable, though of course ultimately hopeless.

II. PNEUMOCOCCUS ABSCESS OF THE PELVIS WITH RECTAL PERFORATION.

The widespread prevalence of influenza and pneumonia during the past winter has brought to the surgeon many complications of which the following may be considered an example.

Mrs. E. H., aged thirty-five, about one month before coming under observation, had an attack resembling influenza, with coryza, fever in the afternoons, very severe cough, free perspiration, substernal soreness. She swallowed all of her expectorate. Two weeks later, she had severe abdominal pain and distention for several days, fever and profuse sweating. Several days later while defecating, there was a bursting sensation, which was followed by a profuse gush from the rectum, of a quantity of yellow discharge, described as purulent. On admission to the Presbyterian Hospital, three days later, the pelvis was found filled by a fixed mass very hard below but softer above. The diagnosis was made of pelvic abscess which had ruptured into the rectum. Dr. Pemberton kindly examined the chest but found no consolidation. Vaginal smears were negative for gonococci, the leukocytes were 15,550.

Although drainage had been already established into the rectum by nature and the temperature had fallen to normal practically, it was considered advisable to establish drainage by the vagina, as less likely to result in a permanent succession of abscesses which would fill and empty into the bowel, with the constant presence of the colon bacillis. It was thought that with good vaginal drainage for the field, the rectal perforation would heal, and this proved to be the case. The abdomen was opened. A very well-organized diaphragm was found above the inflammatory area, made up of omentum and plastic material. This diaphragm was preserved as well as possible, and after the operation, served admirably when laid back, to cover the purulent field. Many epiploic appendages, both tubes and the left ovary were involved in the abscess. The abundant pus was thick and gray, with a strong odor. Both tubes and one ovary were removed. The bowel perforation could not be distinguished in the roughened tissues. The vagina was opened on a forceps point and a gauze drain carried into the pelvis.

An interesting feature was the occurrence of masses of clear yellowish, jelly-like material of the consistence of calf's foot jelly, lying between coils of intestine; some of these masses were an inch in diameter: they were above and outside of the purulent field.

Cultures made from the abdominal pus and later from the discharge from the vaginal drainage tract, showed the pneumococcus and the colon bacillis. The patient left the hospital some five weeks later with all wounds closed, and gaining in weight. There was no discharge from the rectum or from the site of the vaginal opening.

1831 CHESTNUT STREET.

RELATION OF CONVULSIONS TO PELVIC DISEASE*.

BY

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I WISH to call to the attention of the Society the significance that may be found in the relationship of pelvic disease and certain nervous phenomena in women, and to illustrate this by reporting a case of acute torsion of the Fallopian tube in a patient who had been a sufferer from hysterocpilepsy.

It will be impossible to discuss the subject of epilepsy, hysterocpilepsy or hysteria, but I wish to emphasize that in neuropathic women who have chronic disease of the uterus and adnexa, much may be done to relieve the various nervous manifestations by appropriate operation.

Every speciality has been called upon to relieve that most dis-

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trekking symptom, convulsions; and all have reported cures; for instance, circumcision in children, removal of nasal polypi, correction of obstipation or enteroptosis, have been followed by permanent relief. Yet we must be very guarded in our prognosis and be sure we are not dealing with true epilepsy.

The mental and physical activities of a woman reach the highest point just before her menstrual period. When obstructive dysmenorrhea is present, the nervous action is perverted and there is great suffering, not only in the abdomen, but throughout the general system, shocking most seriously the nervous organism.

The question of possible motor irritation resulting in excessive muscular action or spasm must be inquired into, because the presence of either tonic or clonic convulsions implies irritation of motor centers, motor tracts, or motor nerves, but motor irritation may also be excited secondarily by some reflex route.

The full control of the function of a pelvic viscus, as for example, the bladder is dependent upon the reflex centers of the spinal cord and the integrity of the afferent and efferent nerve fibers constituting the arcs from these organs to the cord. Through the operation of the will evacuation of the bladder or rectum occurs normally, but any undue irritability of the reflex centers perverts the impulses to the organ and various phenomena result. Organic disease in any part of the body is usually an irritant to some nerve, and women in particular have highly sensitive nerve centers, which are easily put upon great tension with a resulting abnormal action.

Epilepsy, epileptoid convulsions and hysteria are so closely allied, that many times cases presenting convulsions are difficult to classify. A definition of idiopathic epilepsy is almost always open to argument and confusion in diagnosis is very common.

Periodical convulsive attacks are most commonly due to toxemia of some kind, or to trauma. Although these cases simulate very closely true epilepsy, yet they do not present as typical a clinical picture of an epileptic fit as do the cases usually termed hysterioepilepsy. As the case here reported suggests, some chronic irritation through the spinal arcs to the cord and brain, may result in a convulsion.

Bossi, in a French obstetrical review, believes that hysteria and many neuropathic and psychopathic conditions with their resulting suicides and crimes may be dependent upon chronic lesions of the genital organs. He cites cases in which hysterioepilepsy has occurred in individuals in whom it was possible to demonstrate the presence of chronic genital disease. He also believes that insane

and extremely neurotic women should be carefully examined and if gynecologic lesions are found, they should receive appropriate treatment.

There is a view that a distinct sympathy exists between the pelvic organs and the mind of a woman, and it is this idea that gave origin to the doctrine that pelvic disease may cause insanity and that the cure of pelvic disease may cure insanity.

A very extraordinary report by Hobbes, in which he warmly recommends operating upon the insane, is as follows: Of 211 women whom he examined, 179 exhibited well-marked evidences of pelvic lesions. He operated upon 116 of these with two deaths. 51 per cent. were restored to mental health and 7 per cent. were distinctly improved mentally.

Mutilation or extirpation of the pelvic organs in mental cases without definite pathological changes is not accepted by either surgeons or neurologists, but where there is organic disease, as ovarian, tubal or pelvic adhesions with dysmenorrhea and nervous phenomena, recovery will often follow removal of the disease.

Ten years ago, I removed two cystic ovaries in a girl of eighteen years. She gave a history of severe dysmenorrhea accompanied with convulsions diagnosed as epilepsy. She reported to me for two years after operation, during which time she was perfectly well. I then lost track of her.

Munson says that operations on other parts of the body than the cranium are frequently performed with the view of removing a peripheral irritation which is having an unfortunate influence on epilepsy. Naturally it is a good general principle to adhere to, that the individual should be placed in the best possible physical condition and that this should be done by operation if necessary. Peripheral causes undoubtedly play some rôle in isolated cases of epilepsy. Auer also gives among the exciting causes of epilepsy reflex action through disease of the viscera.

It is a fairly well accepted idea that in an individual predisposed to epilepsy, reflex irritation from some pathological condition, even in such a place as the peritoneal cavity, may cause seizures. Decompression operations for focal disease in the cortex, I understand, has been practically abandoned.

Torsion of the Fallopian tube is a comparatively rare condition, and a search through the literature shows few recorded cases. In the laboratory of the University of Pennsylvania, one case of torsion occurred in 925 inflammatory tubal lesions of which 147 were hydrosalpinx or hematosalpinx.

Anspach collected eighty-seven cases from the literature. Most all were hydrosalpinx with thin adhesions, long pedicles and located on the right side. The chief enlargement is situated in the ampulla of the tube and this is connected with the cornua of the uterus by a fairly long pedicle with thin mesosalpinx. These cases were not diagnosed before operation and are not to be confused with twisted ovarian cyst.

In Cathelin's series of forty-one cases, "*de la torsion des hydrosalpinx*," *Rev. de Chir.*, Paris, 1901, there were six pyosalpinges and he believed that some of these were originally hydrosalpinx which had become reinfected.

Collection of blood in the tube or hematosalpinx is generally attributed to ectopic pregnancy, but A. Louise McIlroy some little while ago indicated the possibility of this occurrence from torsion of the Fallopian tube, and recounts the history of a case in which there was doubt prior to the operation as to the diagnosis between ectopic pregnancy and incarcerated fibroid. The operation disclosed a hematoma from a twist in the tube. Rupture of a hematosalpinx is exceedingly rare, but abdominal abortion usually occurs in pregnancy of the tube.*

Case.—Mrs. B., a white female, aged fifty-six years, was operated on by me ten years ago after having had hysteroepilepsy for fifteen years. Following the operation she has had no seizures. The family history showed no record of convulsions. Her birth and early childhood were uneventful except for an attack of rheumatism when five years old. Menstruation was not established until she was seventeen years old and dysmenorrhea was always present preceding the flow, which lasted from six to ten days. She was married at eighteen and one year later was delivered of her first child. Labor was normal, lasted two days and no instruments were used. Three other labors came at intervals with nothing unusual about them. At the age of thirty (twenty-six years ago) she was delivered of her last child; labor was prolonged and hard, but no instruments were used. Following this labor, the menstrual flux became irregular, with increased dysmenorrhea, and she suffered from pelvic pains, backache and dragging in the iliac regions. These symptoms were almost constant and rapidly exhausted her general condition.

The nervous system seemed to suffer most, and two years later, while undergoing one of her attacks of dysmenorrhea, she had a convulsion. For a few years following this each period was preceded by one of these seizures and after the appearance of the flow which relieved the colicky pains she would be quite comfortable. Her condition gradually grew worse and convulsions occurred at frequent intervals, having no respect for the time of the month, eight typical attacks developing in one day. These convulsions were diagnosed

* *Keen's Surgery*, vol. vi.

by her family physician as "epilepsy," and from the family's description of the fit, I think he was warranted in arriving at such a conclusion. The convulsions were described as being accompanied by frothing at the mouth and biting of the tongue; they were followed by a headache and temporary amnesia. These seizures lasted for fifteen years; other symptoms complained of during this time were backache, hyperidrosis and metrorrhagia.

On October 1, 1906, she visited her home, and while helping a nurse in the confinement of her daughter-in-law, was attacked with severe colicky pains in the right iliac region. The attending physician made a diagnosis of appendicitis and insisted on immediate operation; this was refused and she was brought to Washington. I saw her the day after her arrival, two days after the first attack of pain. She was suffering from severe pain in the right iliac region which was continuous and colicky; superficial pressure caused increased suffering, while deep pressure relieved her a little. The good character of her pulse, which was 80, and temperature, which since the attack had not risen above 99.5, made the diagnosis of appendicitis doubtful. I determined to wait a few days, in which time the intestinal canal was thoroughly cleansed and the pulse and temperature carefully watched. Vaginal examination revealed a high, immovable cervix and tense vaginal vault, but no tumor could be palpated on account of the extreme tenderness and rigidity of the abdominal wall. The pain did not abate with the relief of the abdominal gas, but seemed to increase, requiring large doses of heroin. The ice-cap was of no service; she finally consented to abdominal section for the relief of the pain, and I operated on her the following Thursday, six days after the first attack of colic. An examination under chloroform revealed a large mass to the right of the uterus and a small one to the left. Urinalysis had eliminated ureteral stone and kidney disease; blood examination was not done.

Operation.—A median incision was made, adhesions to the omentum and bowel were separated from both appendages; the left tumor, being smaller than the right, was first raised into the wound and I removed a fairly good-sized hydrosalpinx and cystic ovary. Beginning on the right side of the uterus, I separated adhesions from the mass on that side and exposed a tumor about the size of a large orange, very dark in color and containing fluid. There was no special difficulty in removing the large hematosalpinx. The wound was closed by subcutaneous tier sutures with no drainage. The patient's recovery was uneventful and there have been no convulsive attacks since the operation, now ten years ago.

This case seemed to me to be an interesting one, for several reasons. First, because of the specimen which is a true hematosalpinx, due to twisting of the Fallopian isthmus, thereby obstructing the circulation and consequently causing the venous capillaries to rupture into a chronically inflamed, cystic tube, which is the usual preceding pathological condition in cases of this kind. Simple hematosalpinx or a tube distended by fluid blood is very rare and

should not be confounded with a bloody tumor of the tube due to bleeding from a tubal pregnancy. This specimen seemed to be a true hematosalpinx due to volvulus, and the pathologists have confirmed this idea, with the additional information that parts of the tumor were undergoing organization and tunneling with no evidence of necrosis in spite of the color. Adhesions over the ovary and abdominal end of the tube prevented the escape of blood and the possible introduction of infection into the peritoneal cavity.

Second, the diagnosis was most uncertain. The history of such an acute attack suggested a twisted pedicle of an ovarian cyst. We could not exclude appendix disease or pyosalpinx, and ureteral stone was a possibility. The general condition of the patient was excellent contrary to what might have been expected from her great suffering, her pulse and temperature were approximately normal throughout the attack so I did not subject her to section quite as early as is customary.

Third, it does not seem very probable that the chronic disease of the uterine appendages was the original cause of the convulsions as they existed for a number of years prior to the first detection of a pelvic mass. Of course we must consider the possibility of a long-standing infection of the appendages producing no demonstrable physical changes and yet acting reflexly on the central nervous system.

CONCLUSIONS.

In looking at this case as one of epilepsy, or better, hysterio-epilepsy, cured by a gynecological operation, we must of course remember that, as White says, "an explanation for epileptic attacks which finds its ultimate expression under such symbols as eye-strain, floating kidney, gliosis or like specific indictments fails to realize that the nervous system contains representations of all the organs and that the final activity of the human body is the result of the balance which has been struck among innumerable tendencies. The part that any particular organ plays can only be understood when taken into consideration with the organism in its totality and realizing the specific part that the organ in question plays in the whole problem."

In the case I have presented, we have a disease of the generative organs with which it seems probable that this woman's convulsions were intimately associated, coming on as it did after her last labor, a severe one, followed by a long train of painful symptoms. The relief was probably then threefold: the actual physical relief due to the removal of the mass, the reflex relief from the cessation of irrita-

tion and the psychic relief afforded by her belief in freedom from future disturbances. Of course it is well known that any therapeutic procedure may arrest convulsions in an epileptic for a time, but after an interval of ten years, I think we may be justified in regarding the case as cured.

This case emphasizes the value of a thorough physical overhauling in cases of epilepsy or hysteroepilepsy, especially those developing comparatively late in life, in order not to overlook any possible form of trouble which may be obviously connected with the central nervous system. In women, the pelvic viscera should be especially scrutinized on account of the important part which these play in their physiology and psychology.

I am indebted to Dr. John E. Lind of the Government Hospital for the Insane for assistance in this paper.

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THE CHAMPLAIN.

ACUTE LYMPHATIC LEUKEMIA.*

BY

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WHEN Hughes Bennett, in 1845, published his account of a case of "suppuration of the blood with enlargement of the spleen and liver," one of the greatest controversies of modern medicine was brought into being. To Bennett, the blood at autopsy, was filled with what he believed to be pus cells. No evidence of pyemia or pus absorption was to be found, so he came to the conclusion that he was confronting a new and distinct condition in which pus cells in large numbers originated within the blood stream. For the enlargement of the liver and spleen he could give no plausible account. A few weeks subsequent to the appearance of Bennett's paper, Virchow presented to the medical world an account of a similar case, but Virchow differed with Bennett in his conclusion as to the actual state of the blood in so far as the exact nature of the corpuscular elements was concerned. The "white blood," to Virchow's mind, was not due to the presence of pus corpuscles, but was the direct result of the presence in the circulating fluid of a very large number of white blood cells. Furthermore, it was the opinion of Virchow, expressed at the time, that between the marked splenic enlargement and the peculiar state of the blood there was more than a coincidence—there was a direct relationship. Knowing his own and other cases, Virchow proposed for the newly discovered disease the name of "leukemia," white blood. Now followed the long discussion with Bennett as to the priority of discovery of a pathological process which had excited the widest interest among medical men. Old cases, probably pyemic, were brought to light and thoroughly discussed. With the attention of the profession directed to the new disease, reports of cases appeared rapidly and Virchow was enabled, with the ever-increasing material at hand, to push his researches with vigor and effect. In his earliest case, Virchow had found the splenic enlargement to be the marked feature of the gross pathological picture and in consequence, had named the disease "splenic leukemia." He now re-

*Read before the Washington Obstetrical and Gynecological Society, April 9, 1916.

ported a case in which the condition differed from the preceding ones in that the enlargement of the lymphatic glands was the feature of the gross pathology and the presence of an enormous number of small white cells the striking feature of the blood findings. To this condition Virchow gave the name of "lymphatic leukemia." And in regard to this condition so eminent an authority as Osler states that the acute form of the disease is "one of the most terrible of all the blood diseases." Since the publication of the findings of Virchow, the study of the leukemias has proved of marked interest to pathologists; and the acquisition of fact after fact has greatly simplified the accurate study of the malady and rendered possible the differentiation of the original disease into separate and distinct conditions, all dependent, in differentiation, upon a careful microscopic study of the blood. The studies of Ehrlich on blood staining and the introduction of his diagnostic methods; the researches of Ebstein and Fraenkel have been, along with the work of Neumann, noteworthy events in the recorded history of the disease. Among the early writers, two forms of the disease were recognized—one in which the splenic and one in which the glandular enlargements predominated. At a later date when Neumann added to the literature a description of cases in which changes in the bone marrow were prominent, the term "myelogenous leukemias" came in to general use. It was soon evident that a nomenclature based on the gross anatomic findings was misleading. The investigation and classification of leukocytes by Ehrlich and their application to the diagnosis of the leukemias has proved of inestimable value. As to the nature of the leukemias, theory after theory has been advanced and discarded. Since the first writings of Bennett and Virchow, the pioneers in the study of the disease or diseases which are to-day grouped under the term "leukemia," the debate has been an eager one. Concept after concept was presented, analyzed and abandoned. Bennett argued that it was a suppurative of the blood. Lowit claimed that it was due to a prolongation of the lives of the leukocytes and a retardation of their evolutionary process. Virchow maintained that the disease was allied to the malignant tumors, while on the other hand a school of theorists arose which maintained that the disease was in reality a specific, infectious malady and that the increase in the number of the white cells was a protective leukocytosis. Bacterial forms have been described, but proof is wanting of the direct etiological relationship. Certainly when the rapidly progressive and fatal character of acute lymphatic leukemia is taken into consideration, the doctrine of the analogy to the malignant tumors must

be thrown to the winds, for acute lymphatic leukemia has no counterpart, clinically speaking, among the malignant tumors. Acute lymphatic leukemia is of much less frequent occurrence than the myelogenous form of the disease, though in a series of ten cases, four were of the lymphatic variety. According to Osler, males are more frequently affected than females. From the standpoint of the clinicians, however, two distinct forms of leukemia, based on the blood count, are recognized.

1. Splenomedullary; splenic enlargement marked. Blood count shows a loss of red cells, the presence of nucleated red cells and myelocytes—abnormal to the circulation—and an increase in all other forms. The blood presents the “polymorphous” condition.

2. Lymphatic leukemia. Acute form—large lymphocytes. Chronic form—small lymphocytes. The acute form begins suddenly and proceeds to a rapidly fatal termination, resembling in every respect a severe, acute infection. Fever, epistaxis, bleeding from the gums and mucous surfaces, purpuric spots, a rapidly progressive anemia together with a moderate enlargement of the spleen and glands, characterize the majority of the cases. Recorded cases show a duration of four weeks in the acute form, but as a rule, the fatal end is reached in about ten days. The slow progressive type in which the patient survives for weeks is generally the chronic type of the disease.

Pathology.—Blood pale and opaque, clots readily and has a pus-like appearance suggestive of an acute abscess. Charcot-Leyden crystals may be found. To spread the blood in a thin layer is a difficult matter, and for the accurate study of the cells, a method of straining showing the granulations of the leukocytes must be used. Not only quantitative but qualitative distinctions in the cells exist, corresponding to the deep-seated changes in the affected tissues. The red cell count and the hemoglobin is reduced, and in the event of hemorrhages, this reduction may be marked. The great change in the blood in the lymphatic form, is the enormous increase in the circulating fluid of the lymphocytes—forming at times 90 per cent. of the total leukocyte count. An absolute decrease in the polymorphonuclear leukocytes and eosinophiles has been noted. The first cell in the lymphatic form of the disease is the lymphocyte—the large lymphocyte in the acute, fulminating form of the malady, and the small lymphocyte in the chronic form. The marrow of the bones is of a reddish or grayish-red color. Lymphocytes are present in large numbers. In the spleen, marked enlargement is not the rule. Lymphocytic infiltration and lymphoid tumors of the bones

and viscera are present. On section the enlarged lymphatic glands are of a pinkish color and show a great increase in the number of lymphocytes. Similar changes, lymphoid infiltration, may be found in the liver and other organs which are increased in size, and exhibit, in the symptomatology, consequent disorders of function.

Benzol Treatment of Leukemia.—A few years ago, Von Koryan and his pupils, after an extended experience with benzol in the treatment of leukemia, came to the conclusion that it afforded the only hope of a cure of the disease. Under the use of this agent, a transient increase in the leukocytes is followed by a rapid fall, the manifest enlargement in the glands and spleen disappears, the mental symptoms ameliorate, the red cells and the hemoglobin increase, and the general condition of the patient is much improved. The benzol treatment may be used in all forms of the disease. After the initial increase in the number of white cells has subsided (about ten days) the medicine should be continued until the white cell count is nearly normal and stopped—the decrease in the white cells continues for some time after the discontinuance of the medicine and if continued too long, will result in a leukopenia.

Dosage.—Three to four grams (40–60 drops) daily in capsule or olive oil, but always after meals. Avoid gastric irritation and test the urine frequently for benzol. Hematuria calls for the immediate discontinuance of the benzol. A number of observers have noted good effects from the use of the x-ray with the benzol treatment.

CASE I.—The patient, H. B., was admitted to the wards of Providence Hospital July 17, 1914, complaining at the time of loss of strength and general debility extending over a period of two months and of an extreme degree of prostration during the last two weeks.

As far as the present case is concerned, the family history is negative, there being in the family no history of hemic disorders. The father died of pneumonia, a brother died of cholera infantum and a sister died of diphtheria.

Past History.—General health has always been good. No history of any of the diseases of childhood with the exception of an attack of malaria at the age of six years. No subsequent attacks of malaria noted. As a rule, the patient was not in the habit of indulging in a meat diet, but was however, very fond of sweetmeats in which she indulged frequently. Was accustomed to dancing and frequently remained out late at nights. Occupation typist.

Present History.—At the present time the patient is suffering from loss of strength and marked general debility, together with frequent headaches. This condition has been quite marked for the past two weeks. She states that about two weeks ago was exposed to a

severe storm and that immediately afterward her ankles began to swell. Dizziness, headache and marked difficulty in breathing soon appeared. Slight bleeding from the gums now appeared for the first time. No other hemorrhagic manifestations. The digestive tract shows no evidence of disturbance. About this time, enlargement of the spleen and cervical glands was noted. Soon pain and tenderness in these regions was complained of by the patient. Up to July 17th, the date of her admission to the hospital, the condition of the patient, as regards the general symptomatology, grew worse until death occurred two months later.

Blood Examination.—

		W.B.C.	R.B.C.	Hg.
July	14.....	37,000	1,320,000	23
	22.....	29,000	1,170,000	22
	23.....	20,000	1,000,000	22
	25.....	14,000	700,000	
	29.....	11,400	1,254,000	20
Aug.	2.....	12,000	1,200,000	
	9.....	10,400	1,280,000	
	17.....	10,800	1,518,000	
Sept.	2.....	54,000	1,100,000	20
	6.....	58,000	1,050,000	20
	9.....	48,800	1,040,000	
	12.....	24,600	720,000	
	14.....	Patient died.		

Treatment.—Red bone marrow. Iron and arsenic.

July 22d. Above treatment discontinued. Benzol 5 drops t.i.d.
x-ray applied over left leg.

25th. Benzol stopped. x-ray continued.

Quinine hydrochloride grs. v. every four hours.

29th. Iron arsenate began.

August 2d. Quinine discontinued.

Sept. 2d. Benzol treatment resumed.

9th. Benzol treatment stopped.

Wassermann July 30th reported negative.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

(Continued from page 334.)

TISSUE TONE AS AN INDEX TO VITAL RESISTANCE WITH SPECIAL REFERENCE TO PROLAPSE OF THE UTERUS.

DR. R. R. HUGGINS, of Pittsburgh, stated that the future problems for the surgeon to decide, so far as operative mortality was concerned, dealt largely with a better knowledge of the horsepower of his patient. The excursion undertaken by the patient when surgery was employed was best described by comparing it with a Marathon race. In major operations the patient was subjected to almost the same test that came to the athlete under severe strain. The problem for the surgeon to decide was how far and with what speed could a given heart be driven so that the patient might remain within the limits of safety.

His study showed that it was not only failure of the cardiac muscle to withstand the stress, but in some instances exhaustion of the muscular structure of the stomach and intestines and death ensued from a condition which had been termed paralytic ileus. The underlying condition might best be described as one of chronic fatigue and the tissue changes which occurred might be directly due to long-continued absorption of toxins, infections, starvation or to changes in the sympathetic nervous system which remained obscure and were not understood. One must keep in mind that the maintenance of the circulation was not carried out by the heart alone. The variations which might occur were so complex that one should be able to make accurate measurements upon the envelope as a whole if he was to be certain of its efficiency. A weakened biceps and a flabby heart muscle might be due to the same cause.

The object of this discussion was to call attention to the necessity of a more accurate estimate of the tissue strength in general for much depended upon a keen appreciation of the amount held in reserve by every patient. A study of the patient's history together with careful observation was, and would always remain, the most reliable aids in forming an opinion as to the probable amount of reserve strength in the given patient. Much might be learned by a careful examination of the resistance and consistency of the muscles at rest and in action. The history of any disturbed condition in the function of the thyroid gland always suggested the probability of friable muscular tissue lacking both tone and strength. A kidney function test should be made previous to every major operative

procedure. The value of the x-ray in certain instances should not be overlooked. The electrocardiography might be another important aid, but whether it was of great value in measuring the actual strength of heart muscle had not yet been determined. His results would be embodied in a later report.

Perhaps the method which offered the greatest possibilities was that described by Graupeur and partly confirmed by the work of Barringer. The essential features of this test were the deductions made from systolic blood pressure after measured amounts of work.

The author emphasized the importance of another danger signal which might be observed by the gynecologist. A keen appreciation of this danger was in some instances of great importance. He had been impressed with the frequency with which loss of tissue tone together with a flabby heart muscle was found in prolapse of the uterus in certain individuals. His records showed that in 1000 major gynecological operations there were fifteen deaths exclusive of several deaths which occurred in different varieties of infection which occurred following delivery. Three of these deaths followed operative procedures for the relief of prolapse. In every instance he was not unmindful of a certain risk and operation was undertaken after careful consideration of the margin of safety and the operative procedure adopted which might give the least amount of stress. This experience together with the necessity of refusing operation to several patients with prolapse on account of apparent muscular weakness had led to the conclusion that in certain cases of prolapse uteri serious consideration should be given to the study of the general condition of the patient with especial attention directed to the heart muscle. A keen appreciation of this subject would enable one to make a more accurate calculation of how much stress a given patient would stand without fatal results. It would compel one to select the form of anesthetic which threw the least amount of work on the heart muscle and which lessened shock and postoperative distress for in many instances it held the balance of power. It would demonstrate the value of rest and careful treatment directed toward increasing the strength of the patient previous to operation.

PAINLESS LABOR.

DR. J. CLIFTON EDGAR, of New York City, directed attention to the recent general agitation over the question of painless labor, saying it had accomplished much good, first, in stimulating research into newer and even older methods of painless labor and, second, in demonstrating that the use of some preparation of opium, intelligently administered, was not as dangerous to the unborn child, as had been supposed in the past, and third, in emphasizing the baneful results of fear, pain and shock of labor upon the present and subsequent mental and physical condition of the highly civilized neuro-pathic woman of the day.

Many, possibly the majority of the upper highly civilized class of women were physically and mentally unfit to suffer an approach

to spontaneous labor, by reason of their low resistance to the shock of labor; hence these women had pathological labors and were themselves neuropathic.

Never before had the need for an artificial painless labor been more urgent. Shock from the pain of labor in the highly civilized neurotic woman must be reckoned with in general childbed mortality. Painless labor in these women was a life-saving measure. Moreover, shock produced by the first stage of labor in these patients was a fact, not a theory.

For the moment there was no ideal single method of painless labor. The only absolutely painless labor was one terminated by surgical means with complete anesthesia. Conditions would always arise, for example in early rupture of the membranes, in which the necessity for painless labor would demand such surgical termination.

The ideal narcotic, analgesic anesthetic for painless labor should possess the anoci-association of surgical practice, namely, first, the blocking of pain, fear, shock and reflex sympathetic factors; second, the removal of reflex spasm and its resulting spastic or functional rigidity of the birth canal.

The most satisfactory painless labor method of the moment combined opium and antispasmodics for the first stage, with possibly vapor narcosis toward the end of this stage; vapor analgesia and anesthesia for first and terminal parts of the second stage respectively. The narcosis aimed at until the perineal stage, should be analgesic and not anesthetic in character, whether by drugs or vapor, a difficult or impossible object to attain unless one had had considerable experience.

Ether and chloroform were too well known to need comments. Both in time lessened the force of the contractions and thereby delayed labor. Unlike nitrous oxid vapor, they possessed no oxytoxic action. They were the pain controllers of the second stage, especially the perineal stage.

As an intermittent analgesic or anesthetic, the nitrous oxid oxygen mixture was well adapted to the second stage. Webster and his associates had done much to make this method of painless labor popular.

In the second stage, it did not interfere with uterine contractions as did ether and chloroform, but by arresting pain prevented shock and exhaustion, and the resistance not being lowered, the patient was the better able to withstand subsequent infection or complication. The author's experience had been limited entirely to its use in the second stage, and in all the mass of recent literature upon the subject, he gathered it was of no value in the first stage, or the writers avoided mention of its status in this stage.

In the hands of inexperienced hospital internes, the author's results with this method had been deplorable, if not dangerous to the patient. Under the management or supervision of a first-class anesthetist, the method worked out beautifully.

He had experimented with three gas machines and finally settled upon a simple single bag instrument.

He dissented from the announcement that the administration was safe in unskilled hands. It was difficult to reconcile the statement of the recent advocates of nitrous oxid-oxygen analgesia and anesthesia, with the teachings of some of the most expert users of this gas combination. On the other hand, we were repeatedly told that the use of nitrous oxid and oxygen for analgesia and anesthesia was a simple matter for one to become proficient in after a few trials.

To sum up: Nitrous oxid-oxygen analgesia or obstetric ether or chloroform for the second stage, pushed to anesthesia for the perineal stage; possibly forceps delivery with vapor anesthesia to eliminate part of the second stage. Nitrous oxid-oxygen analgesia or anesthesia was superior to any other during labor because of its oxytotoxic action. Eventually an established method of painless labor might be related to public health questions. Lessening or abolishing the pain of labor might in the future limit birth control and criminal abortion. Drug addiction after a prolonged drug narcosis in the neuropathic, was a possible contingency. The dangers to the unborn or newly born child were negligible when drug narcosis was limited to the first stage.

DISCUSSION.

DR. COLLIN FOULKROD, of Philadelphia, gave an analysis of thirty-two cases, personally observed and attended by him. Of these nineteen were primiparæ, and thirteen multipara. The average time in labor was fourteen hours; twenty-two L.O.A. presentations; four R.O.P. presentations; three R.O.A. presentations; one face presentation; eight forceps deliveries, only two above the perineum. All children living, and all mothers living.

The conclusions were not yet matured, but he would add one point of view to the large number of cases collected to-day. The fact that the number of cases was so small brought out one of the strong criticisms against such methods.

There were only twenty-four hours in each day, and stretch them as we might, an obstetrician must, at least, eat. If the development of these methods of analgesia was demanded by patients, they must come forth and engage two physicians, that they might act in relays as it were. Both must be competent to judge of the effect of the anesthetic used upon both mother and unborn baby. The speaker had not yet reached such a stage that he could with equanimity go from a house and allow a patient or even a nurse to continue anesthesia over hours of time without some method of checking up results. Were patients willing to compensate obstetricians for such service?

It was unjust and perhaps dangerous to the best interest of the patient to have the attending physician to minutely attend for hours without rest and then to find the grave necessity of some serious obstetrical operation placing him at a time when he was both mentally and physically exhausted. At times, our best judgment was matured away from the bedside in such exacting work.

There was no known accurate method of checking up the effects upon the child *in utero* of any anesthesia administered to the mother.

To advance the idea that careful watching of the fetal heart sounds would show variations meaning danger to the child, evidenced an entire ignorance of the principles of acoustics, and of the normal variations of the heart sounds occurring during the mechanism of labor.

A few questions briefly answered from the writer's experience were as follows:

1. Does nitrous oxid anesthesia quiet the patient? Yes, decidedly so, when given during labor pains. He had found that all patients complained less, were quieter between pains, and while some averred that it was not as highly anesthetic as ether, which they had had before, they received the measure of analgesia that the operator wished.

2. Does it quiet the subjective sensation of pain? In 50 per cent. of cases, decidedly so. In the balance, perhaps because of a tolerance too much of the gas was required to get good analgesia. By this is meant that, after finding the usual quantity needed for the average pain and the average woman, he hesitated to go beyond that quantity for reasons given below.

3. Does it retard or lengthen labor by quieting sensation of pain? Yes, if the pains are very frequent. Even with such a fleeting anesthetic as nitrous oxid the writer had found that at the end of almost an hour the patient became saturated and did not wake up as readily. When ceasing to give the anesthetic for a time, several pains would elapse before they again complained severely.

4. Does it stop uterine contractions? All anesthetics would stop uterine contractions if pushed far enough; nitrous oxid in a less degree than chloroform, morphia or ether. Each patient reacted differently and it required trained watching to prevent deep anesthesia even with the gas.

5. Does it relax the cervix? The author had never seen a cervix relaxed by nitrous oxid. It was, however, true that relieving the fear of pain always allowed of more strenuous efforts on the part of the patient, and more rapid progress was made on her part in approaching an average physiological relaxation of the cervix by her own efforts.

6. Does it relax the perineum? Here also the answer was no; that any direct relaxing effects, such as would be attributed to chloroform in this stage of labor must be denied. The author was still of the opinion that ether skillfully given, or per chance chloroform, was the ideal anesthetic when the head was passing over the perineum.

7. Does it relax the patient muscularly? He had failed to secure sufficient relaxation to apply forceps or properly insert stitches; this not because of lack of anesthetic effect, but because of a curious jactitory stage, which had been his observation for years was present in continued nitrous oxid anesthesia.

8. Does it nauseate the patient? If given long enough it did.

His number of nausea cases was perhaps defective, being only 15 per cent. But if continued long enough, there occurred an active nausea and vomiting, which might be an aggravation of a preëxisting nausea caused by the stretching of the cervix. In some instances, however, it was distinctly produced by putting the mask over the face and starting anesthesia.

9. Does it asphyxiate the baby? In about 50 per cent. of cases, when the anesthetic had been used in both first and second stages of labor, or for some time during labor, the babies were born blue but seemed to cry vociferously immediately upon being born, and appeared to be in no way harmed by the anesthetic, the color clearing up in the usual time. In the rest of the cases the babies seemed normal. He had not had any baby die after this method of anesthesia.

10. Does it compare with ether and chloroform for the same purpose? Excepting for the relaxing effect upon the perineum or when doing a version. The author did not think chloroform should be given during labor, because he believed that in ether we had a much safer anesthetic which would accomplish the same purpose.

He was confessedly a straight ether enthusiast. He had tried other anesthetics, and he was trying in an impartial spirit the present one. but up to the present writing he failed to see where nitrous oxid could be used that ether could not be used by a skilful man, and with much better effect to both patient and operator. With this exception, nitrous oxid was a gas and ether must be vaporized, the former was therefore much more quickly available and would be so until the attempts now being made to do so gave us a much quicker method of vaporizing ether. His point here then was this: Give ether in a vapor state, or should we say an anesthetist who had learned how by apparatus or otherwise to secure the true vapor mixture with ether, necessary for anesthesia, that then, ether entered into competition with nitrous oxid for this purpose.

Either one of two things was true; the nitrous oxid sold in cylinders on the market was a very dilute gas, or the claims of nitrous oxid enthusiasts were not proven. The only thing proven in the cases coming under the writer's observation was that the patient came out of the anesthetic quickly. Certainly, in the majority of cases she did not go under as quickly, and it seemed to take an enormous amount of the gas to make any patient acknowledge that she did not feel any pain. This without much oxygen in the mixture.

It might be true that the type and the severity of the pain were different and so much greater than those for which nitrous oxid had been previously used, that he expected some magical effect in all cases. Certain it was, but in a few cases in the series in which experimentally he would use nitrous oxid for a few pains and then, ether for a few pains, and then chloroform, in the same patient in one labor, the effect of the nitrous oxid was as good subjectively as either of the other two.

The question of whether part of the analgesic effect might not be produced by the deep breathing advised when using the gas, had

not in his mind been fully cleared up. Many had noted almost suggestive or hypnotic anesthesia by such a method before they had ever thought of nitrous oxid.

11. Does it produce bronchial irritation? None of the author's cases manifested any continuing irritation, and in those cases where any suggestion of bronchial irritation arose, he felt sure it was due to the then prevailing epidemic infections.

12. Does it produce irritation of the kidneys? He found that the number of catheterized specimens sent after labor was inadequate to form any conclusions.

DR. W. FRANCIS WAKEFIELD, of San Francisco, California, reported 100 consecutive cases. Of stillbirths there were two. One of these was a high forceps delivery and probably should have been delivered by Cesarean section. The other was an anencephalic monster which could not have survived birth. Ninety-seven cases belonged to class 1. Class 1 meant patients who had no knowledge whatsoever of their labor from the time they went to sleep until they woke up and found their babies born. Three cases belonged to class 2. Class 2 referred to patients who carried away from their sleep some unimportant recollections of occurrences but no recollection of pain. Of these 100 cases fifty were primipara and fifty were multipara. The average length of time of the labor was for primipara thirteen hours and twenty minutes; for multipara nine hours and ten minutes.

There was no case of postpartum hemorrhage.

Child bearing among the women of to-day, with the type of nervous system which culture and education had developed, was unquestionably a formidable experience, productive, in its general results, of a great deal of physical wreckage, most of which was unavoidable. Because custom had made us look with tolerance and complacency on the suffering endured by women during labor was no reason why women should be allowed to continue to suffer when such suffering was avoidable, and that it could be avoided was an unquestionable fact. Moreover, the intelligent women of America were daily becoming more cognizant of the fact that there existed means to alleviate their distress, and naturally were coming more and more to the point of expecting such means to be used. They consulted their accoucheur and generally met at his hands discouraging criticism of the different methods that had been successfully practised. It was this opposition of the profession that was doing more than anything else to retard the progress of the use of anesthetics in labor. Groundless criticism, however, could not long or successfully endure against an aroused public opinion, particularly when that opinion was well founded. For the most part this criticism came from men who had never personally used any of the prevailing recognized methods. Perhaps a general antagonism had been created by the undesirable publicity that had attended the use of the scopolamin method. To those who had used a good method and still condemned it, he could only say that somewhere there had been something faulty in its application, for he knew that at least one method was capable of consistently satisfactory application.

Anesthetics in labor had come to stay. They meant too much to the economic life of women to pass into disuse. Dissatisfaction with the old régime had become more and more pronounced as time passed. It behooved those who practised obstetrics to consider well the attitude toward those means that had been successfully used by reliable members of the profession for the elimination of conscious pain in labor. It was much wiser to voluntarily advocate some good method now than to have such advocacy eventually forced on us by public demand.

For two years the author in his private practice had been using scopolamin as a continued anesthetic. One hundred and seventy-five patients had been thus treated. In his hands scopolamin had proven itself to be an absolutely ideal anesthetic in labor. It would be difficult for him to picture anything more satisfactory. He had yet to meet the patient on whom it had failed to work satisfactorily, and he had yet to see a single contraindication for its use. It disturbed none of the vital functions, on the other hand, conserved them, nor were the labor pains rendered less efficient. Sanely used, scopolamin was a perfectly safe anesthetic. The best interests of both the mother and baby were subserved by its use. Its efficiency was entirely dependent on the reliability of the preparation used, and on the skill and good judgment shown in its administration. Perfection of results increased with experience.

Rather ideal conditions and surroundings were required for its success. For this reason it might fail to give satisfaction in the crowded wards of hospitals devoted largely to clinical work, especially where there was insufficient funds provided for the obstetric service. In private practice, however, most men who wished to take the trouble to do so could very easily create conditions that would make its use in every way practicable.

DR. JOHN OSBORNE POLAK, of Brooklyn, New York, stated that his experience included the use of morphin-scopolamin in something over 500 cases, the use of gas and oxygen in over 100, etc. In over 550 cases, the last time he went over his cases, he found that there were four fetal deaths. All these four fetal cases were autopsied. Three of the women went to full term, and the babies died within twenty-four hours after delivery. The autopsy showed in one a diaphragmatic hernia, in another atelectasis; in one there was hemorrhage into both suprarenal capsules, and in the fourth he was unable to find any cause of death explainable at the autopsy except the child was premature as a result of placenta previa delivery. There was one maternal death in a case of placenta previa where the morphin-scopolamin was only used in the early part of the first stage of labor and was discontinued after the second dose of scopolamin in a very long labor. A bag was introduced in that case, and he could not say that there was any relation.

Scopolamin-morphin had a definite place, just as gas-oxygen had a definite place in obstetrics, and each did certain definite work and neither could do the work of the other. He used morphin-scopolamin in the first stage of labor which relieved the terrible sacral

pain which was not relieved by gas-oxygen, and gas-oxygen was used in the second stage which produced analgesia, and in a large percentage of cases the labor was absolutely painless. After the delivery of the baby he gave the woman an extra dose of scopolamin-morphin, so that surgical shock was absolutely guarded against.

It was known definitely that the use of scopolamin-morphin shortened the time of the first stage of primiparous labors and carried the women along to complete dilatation of the cervix. There was practically no danger from the use of scopolamin-morphin in the first stage of labor. There was danger in the second stage of labor with prolongation of the second stage.

DR. WALTER P. MANTON, of Detroit, Michigan, said he had tried nearly all the methods of producing anesthesia which Dr. Edgar has spoken of with the exception of scopolamin-morphin which never appealed to him. Therefore, he had finally settled on amnoform and chloroform. Amnoform was injected hypodermically, using 1 ampule of 11 c.c., to complete the first stage of labor. He had used this drug in seventy-five cases and the results were eminently satisfactory both to the patients and to him. In 25 per cent. of the cases a second ampule may be given after a couple of hours, and if that was not effectual the administration of chloroform would complete the successful treatment.

In the majority of these patients results were practically the same as those obtained by the advocates of so-called twilight sleep. In the majority of instances the patients were unconscious at the time of the birth of the child; they awoke in a vigorous condition, and there were no untoward sequelæ.

As far as the infants were concerned, he had yet to lose any infant from the administration of this combination, and in only two or three instances had the child been affected as much as when morphin was given alone. There was no asphyxia or amnesia of the child as a result of this combination.

DR. ROBERT L. DICKINSON, of Brooklyn, New York, said it was gratifying to see the old chloral method revised which had been somewhat disused. Almost all gas-oxygen apparatuses contained now an ether attachment. Instead of sticking to one method, if one switched on the ether in addition to the gas-oxygen he had a method which was constantly being used now by those who were frequently employing gas-oxygen for major work. Let it be said that this was a method for the expert; it was costly; it required a resident anesthetist, but that the gas-oxygen ether combination was a great advantage and one more resource for the obstetrician. Gas-oxygen anesthesia in his experience had enabled the obstetrician to sew up the lacerated perineum at once without relaxation of the uterus, such as is produced by chloroform, and particularly by ether.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held April 25, 1916.

DR. GEORGE W. KOSMAK *in the Chair.*

DR. SOLOMON WIENER presented the specimen and reported a case of

DEGENERATING FIBROID WITH MARKED TOXEMIC SYMPTOMS.

He said, "The specimen which I wish to present consists of the uterus with adnexa and a large submucous fibroid. The whole mass is shrunk from the preserving fluid. The uterus has been split open and also the fibroid in order to facilitate examination. In the fresh state the uterus was the size of a five months' gravid organ and the fibroid was as large as a grapefruit. The tumor was under great tension, the uterine wall being markedly thickened, so that when the uterus was cut open after removal the tumor literally "popped out." On cross-section the tumor showed marked edema with softening. It was deep purple in hue, contrasting strongly with the pink color of the uterine musculature, and showing irregular areas of deep red, yellowish and gray discoloration. The color values of the specimen still come out well. The pathological report on histological examination was 'fibromyoma showing edema and beginning degeneration.'"

The patient from whom this specimen was removed was forty-five years of age, had been married twenty-seven years and had had six children and one miscarriage. One year ago she had been operated upon for acute appendicitis. Menstruation had always been regular, occurring every twenty-eight days and lasting four or five days with moderate flow; it was accompanied with some pain. For the past two months she had been bleeding every two weeks, the amount of blood lost being about as much as at the normal menstrual periods. Her present illness began about four days ago with the sudden onset of severe pain beginning in the left lower abdomen; this persisted and later radiated to both groins and sides. The pain gradually subsided but reappeared yesterday with great intensity. The patient felt continuously nauseated and vomited once during the night. The bowels were moved by enemata. There had been frequent urination with tenesmus.

When I saw the patient in the afternoon she impressed me as being very ill. There was marked prostration, the face was of ashen

hue, the tongue dry, pulse 120 and of rather poor quality, and temperature 100.8°F. The attending physician stated that the pulse had been 120 for two days and that the temperature had ranged around 100°F. Physical examination showed marked tenderness over the lower abdomen with voluntary rigidity. Bimanually a large mass could be felt filling the hypogastrium and extending from the symphysis to halfway up to the umbilicus. The mass was firm, very tender and somewhat elastic. The uterus could not be felt separately from it, and the cervix apparently moved with the mass. This latter factor strongly inclined us to the belief that we were dealing with a fibroid. However, the elasticity of the tumor, the severe pain, the vomiting, together with the rapid pulse and low temperature all pointed to the possibility of the mass being an ovarian tumor with twisted pedicle. Because of the thickness of the abdominal wall an absolute diagnosis could not be made until the patient was under anesthesia. The indication for operation, however, was clear. The patient was removed to Mount Sinai Hospital and at nine o'clock of the same evening I performed a supravaginal hysterectomy. The operation was the typical and was without unusual difficulties. The patient's condition on the table was poor, her pulse running up to 160 after only fifteen minutes' operating. Fortunately she responded fairly well to stimulation. For twenty-four hours after the operation her pulse and general condition were such as to require active stimulation. After this her subsequent convalescence was uneventful, being marked only by a superficial collection of serum in the lower angle of the wound."

The chief point of interest in the case is the marked toxemia with the relatively slight degenerative changes in the tumor, the patient being far sicker than the mere recital of her pulse and temperature would indicate. The severe pain is readily explained by the edema and the tension under which the tumor was held by the hypertrophied uterine walls as well as by possible attempts of the uterus at extrusion of the mass. The submucous character of the tumor must be the reason for the marked absorptive symptoms and toxemia. Evidently there was as yet no infection or the temperature would have been higher. This class of tumor must be classed as truly urgent for the moment that infection or degenerative changes occur in a submucous fibroid the patient's life is endangered by the rapid absorption from this site.

DR. WILLIAM H. CARY read a paper on

EXAMINATION OF SEMEN WITH ESPECIAL REFERENCE TO ITS
GYNECOLOGICAL ASPECTS.*

DISCUSSION.

DR. MAX HÜHNER said: This paper is interesting to me because I have been working on the same subject. But I cannot sympathize with these methods of collecting the specimen which Dr. Cary

* For original article see page 615.

employs. It means more work, is rather complicated and is not as accurate as taking the specimen from the cervix. Furthermore, the cause of sterility may be due to the fact that ejaculation occurs before the penis gets into the vagina, or because of hypospadias or epispadias. The *condom* specimen may be perfectly normal and yet some of these things be the cause of sterility. The other method is so very simple; have the woman come to the office after coitus and take a specimen of mucus from the cervix by means of a platinum loop and if live spermatozoa are found you can tell right away whether the secretions of the vagina are harmful or not, and whether the husband is all right.

Another point I would mention is in reference to the effect of pus on the spermatozoa. If semen contains pus it is not in a normal condition but this is not an absolute test as to its power to fecundate; I have mixed live spermatozoa with live gonococci, and the spermatozoa seem perfectly happy and were not killed; a man with gonorrhea may impregnate and give the gonorrhea at the same time, so that the presence of pus is by no means an absolute test.

As to the test of the viability of the spermatozoa, neither is that an absolute test, because during the examination of the semen under the microscope it is not in its natural condition, but these same spermatozoa taken from the vagina after two or three days might still be active, while they might die in a very short time under the microscope.

There is another question which was brought out two or three years ago and that is that we do not know anything about the viability of the spermatozoa in the Fallopian tubes. In a few cases in which death has occurred as the result of accident spermatozoa have been found twelve or fourteen hours after coitus in the Fallopian tubes. Such an examination should be made in every case in which we take out the tubes and ovaries. We should find out when the last coitus took place and then make an examination for living or dead spermatozoa and in this way we may get some information as to how long it takes them to reach the Fallopian tubes and how long they survive in that locality, without relying on the rare cases of sudden death due to accident or murder.

DR. HENRY C. COE said: Many innocent women have borne the blame for sterility and have been subjected to operation, when an examination of the husband would have shown that he was the guilty party. The profession has been too ready to resort to curettage in cases of sterility and to make positive promises as to the success of this procedure. Instances have come under my observation in which one or more operations was done when it was found at length that the husband had azoospermia; therefore I am opposed to subjecting a woman to an operation for sterility until the condition of the husband has been determined. The suggestion that an examination of tubes that have been removed should be made in order to determine the possible presence of spermatozoa the length of time during which they retain their vitality, is a good one, and I do not think that this has been done.

DR. THOMPSON T. SWEENEY said: I am interested in this subject because I have a large clinic of Jewish women to whom sterility is a disgrace. In treating them for this condition, I do so only until any pain that they may have is relieved or any tubal condition perceptible to the touch is relieved. I am unwilling to submit these women to further treatment for their sterility until I have made certain that the husband is not sterile. It is often difficult to get specimen of semen from some husbands, due to their ignorance in believing that such a request is a reflection on their manhood. It has been a point of great interest to me to find that men who appear absolutely healthy or powerful or robust, who have never had gonorrhea, mumps, or any affection, are sterile; their semen showing complete absence of spermatozoa.

As to the technic of collecting the specimen, I have made use of the condom tied and dropped into a vaseline bottle containing water at 100°F. In cold weather this bottle is wrapped in flannel and paper to retain the heat. When the husband is intractable and refuses to aid us, I have the wife beguile the husband into coitus just before she comes to my office, when I take the specimen from her vagina.

I agree with Dr. Coe, who said that any operation upon a woman for sterility is inadvisable until first examining the husband. Many of these women have an occlusion of the tube sufficient to prevent pregnancy but too slight to be detected by digital examination. This condition quickly yields to local treatment.

I too have seen cases impregnated at the same time that they were infected with gonorrhea. One case I remember was a ruptured tubal gestation in double pyosalpinx.

DR. WILLIAM H. CARY, closing the discussion, said: There are one or two points to which I wish to refer. I did not attempt to take up the subject of impotence except to refer to it as included in the general subject of sterility but not properly a part of this study. Dr. Hühner, who spoke of the method of examination, has in my opinion spoken from an entirely erroneous viewpoint. He speaks of taking the specimen from the vagina. If a specimen thus secured is vigorous it is of course conclusive, but he may do this and find the spermatozoa dead, having been killed by hyperacidity or other chemical changes in the secretions of the vagina, when if he had taken the specimen directly from the male it might have shown normal vitality. Therefore a specimen from the vagina or from the cervix is not a fair test as to the fertility of the male element.

I also have been interested in noting these powerful men to whom one of the speakers has referred, who with negative venereal history show sterile semen. I have had experience with college men and athletes upon whose honesty I could depend. Some of these cases are very interesting. I have found a condition of sterility in brokers, in clergymen, and in lawyers, who were carrying heavy work and responsibilities, and I have found that sending them away on a prolonged vacation and giving them a chance to recuperate improved their semen, and in a number of instances their wives ultimately became pregnant.

DR. ARNOLD STURMDORF read a paper on

CONGENITAL AND ACQUIRED RETROPOSITIONS OF THE UTERUS: THEIR DIFFERENTIATION AND RELATIVE SIGNIFICANCE.*

DISCUSSION.

DR. DOUGAL BISSELL said: It is difficult to discuss a paper of this kind without first having digested it to some extent. I tried to write a few things last night, but changed my mind for I have not yet digested Dr. Sturmdorf's paper. I have never been able to determine just what congenital retrodisplacement is. I conceive it as dependent upon structural defects as real as those of congenital prolapse of the entire uterus. As to the difference between congenital and acquired retroversion we may assume that in the congenital type the uterus has never assumed the anterior position while in the acquired type of retroversion we may assume that the uterus has occupied the anterior position at some time.

I have never definitely recognized a case as one of congenital retroversion, except in one instance; I mean a case that exactly fits in with my idea of congenital retroversion. This case occurred in a young woman who had a backward displacement of the uterus and a prolapsed double kidney, which filled the entire right side of the pelvic cavity to such an extent that it would have been impossible for the uterus to have assumed the normal position. When we operated we found the kidney anterior to the uterus and holding the latter in retroflexion. In this woman we replaced the kidney but neglected to employ operative measures to correct the retroflexion. I waited to see the results of the displacement of the fundus. A pessary was worn for a time but it did no good. Later the woman married, conceived, and was delivered of a normal child. This was undoubtedly an instance of congenital retroflexion.

DR. GEORGE GRAY WARD said: As I did not hear the paper I am handicapped so that I am in no position to discuss it. I can only say that I feel that when we have a case of retrodisplacement we must not assume that this is necessarily the cause of backache, for we all know that backache may be associated with faulty posture, irrespective of the position of the uterus. As to the congenital type of retroversion I think it is not common, and that when we do find it there are not many symptoms associated with it as a rule, as we find in retroflexion or retroversion with subinvolution following abortion or labor.

In congenital retroversion we may find a short anterior vaginal wall and a faulty implantation of the cervix, and the position of the cervix cannot be corrected without correcting the short vaginal wall by an operation such as has been suggested by Dr. Reynolds of Boston. All of these cases must be studied individually and their type determined and the type of operation which meets the requirements of the individual case chosen. Too often a man has a fad, some particular operation for retroversion or retroflexion which he

* For original article see page 386.

applies to all cases of retrodisplacement. The operation should fit the peculiar condition present. There are many cases suitable for the Alexander operation; if the uterus is freely movable and can be replaced that case will do well with the ordinary Alexander operation, especially if the woman has borne children and the ligaments are well developed.

The Webster Baldy operation is suitable where we have an adherent retrodisplacement with denuded surfaces on the posterior wall of the uterus. Here the round ligaments may be used to cover up the raw surfaces; the same may be said of the Coffey operation when we have a denuded surface on the anterior wall. When the round ligaments are elongated and in good condition, I do a Simpson operation; this leaves no loop where the omentum or intestine may become strangulated. Shortening the uterosacral ligaments when the uterus is prolapsed is a great aid. I do not believe in using the round ligaments to support a straight prolapse. Nature does not use muscle for this purpose and the round ligaments are muscles. The broad ligaments and uterosacrals support the weight and the round ligaments simply limit the backward excursions of the uterus. It would seem from the anatomical construction of the pelvic organs that woman was never intended to walk upright.

DR. JOHN VAN DOREN YOUNG said: A clear concept of a deformity is the first requisite for its correction. One does not have to listen long to this discussion to learn that a clear concept of the displacements under consideration is lacking. I believe that Dr. Sturmdorf has cleared the horizon and that he has given us some basis for further work along this line. In a series of 6224 cases of pelvic conditions which I recently reported over 2300 showed some type of retroposition of the uterus. This gives one some idea of the importance of this form of displacement. I have listened carefully to Dr. Sturmdorf's paper and am very much interested in this subject but I must confess that I do not understand his statement of congenital *versus* acquired retroversions. Each one who discusses this subject should say just what he means by the term he uses. I think about 90 per cent. of our trouble in discussing this problem is due to a misunderstanding of terms, and the large number of operations are due to our faulty conception of the deformity we are trying to correct. I think Dr. Sturmdorf's statements with reference to the poise of the body and his study of the skeleton of the female give a rational basis for an easy and simple method of finding the type of retroversion with which we are dealing. This discussion is not of any operation but of the comprehension of the meaning of retroversion and we may understand by this term a pathologic mechanical retroversion with or without faulty poise, and with or without prolapse; where there is flexion due to adhesions it is an entirely different subject. From the standpoint which Dr. Sturmdorf presents this subject it opens up a large field; it shows why operations have so often failed and why we need the help of the orthopedist in the correction of these displacements; it shows why with the same technic one operator fails and another succeeds; why Dr. Hirst of

Philadelphia reports 1000 cases with 100 per cent. cures by the Alexander operation and Dr. Cragin at the same time gives up this operation because he gets no results, why Dr. Kelly after having performed 880 ventral suspensions then gives it up.

I seldom take issue with Dr. Sturmdorf but there is one point upon which I disagree with him, that is that a retroposition of the uterus, a mechanical pathologic retroversion with retrocession of the fundus, antrocession of the cervix, and decensus of the whole uterus is cured by a pessary or correction of body poise, these methods have failed in every patient I have ever seen and if I am mistaken in this I would like Dr. Sturmdorf to correct me.

I believe we should resort to operative interference after the pessary has failed. Twenty-five years ago we talked nothing but pessaries; within the last five years nothing but operations, and now the pendulum has swung the other way.

In these cases we are dealing not only with a deformity as we find it but as it will be in the future.

I would like to ask whether a mispoised skeleton might not have been acquired as the years passed, not by evolution but by a lack of education and development.

When we remember that retroflexion and retroversion of the uterus are important factors affecting the home relations and the life and happiness of the woman and the entire family, we must realize that if we can solve this problem we shall remove a real trouble from many lives, for there is not one of us who is not convinced that this deformity is a detriment to the health of a woman and should be corrected.

DR. LEROY BROWN: Dr. Sturmdorf's paper is such a close study that it is difficult to fully appreciate the various steps of his argument. To do so it will be necessary to read it carefully and at leisure. I wonder whether Dr. Sturmdorf means to include among congenital retroversions such conditions associated with a general ptosis of other organs; in the latter condition it would be useless to operate on a displaced uterus when there existed a ptosis of other organs as of the digestive tract and kidneys. I would not operate for retroversion alone when other ptoses were present. When there are symptoms of retroversion, backache, etc., not dependent upon an ill-fitting corset, or in cases in which sterility supposedly is due to retroflexion, I get successes from operative procedures in a larger percentage of cases than I get failures.

DR. SAMUEL BANDLER said: If Dr. Sturmdorf's method of getting this "index" will in the future show us the cases of congenital retroflexion without it being necessary to make a rectal and vaginal examination, he will have added greatly to our gynecological knowledge. If we have practised gynecology and failed to recognize a position of the body as typical of a malposition of the uterus, such as that to which our attention was attracted in the picture just shown, we have at least now been shown the A, B, and C of uterine displacement. It does not seem to me that it has proved any point. For a long time I have used the term retrodeviation to signify a

simple retroflexion or a retroversion. A retrodisplacement on the other hand is a change from the normal due to a shortening of the uterosacral ligaments. If Dr. Sturmdorf means a retroflexion I would be willing to discuss the subject from that standpoint, but what we want is the right names for these conditions.

The type of retrodeviations that takes place in a nulliparous woman is entirely different from that in a woman after her first labor. This is a reason why the practice of obstetrics is of value to the gynecologist and explains why a large number of operations for retrodeviation fail. We can say that a certain number of these patients have a congenital retroflexion and a certain number have acquired retroflexion. We all know that labor is responsible for the acquired retroflexions. In a certain number of cases there is a descent of all the pelvic tissues allowing the cervix to come down. Whether our efforts at correction of the retroflexion succeed or not depends on the ultimate position of the cervix. When the cervix is low down, it is natural for the fundus to fall backward and corrective or operative measures must lift up the cervix and replace the fundus forward.

In a large number of congenital retrodeviations the anterior vaginal wall is extremely short and for years I have been paying attention to this subject. These are the hardest cases to replace with a pessary because the pessary cannot put the cervix high up and as a consequence the fundus falls back, because the short vaginal wall will not permit the uterovesical ligaments to stretch. The uterosacral ligaments are too loose, and here if we do an Alexander-Adams operation and shorten the round ligaments, the result is that we have simply doubled the uterus up on itself and it will not stay in place. The proper thing to do in such a congenital case is to open the abdominal wall and to place the uterus in such a position that we can fasten the fundus to the abdominal wall, even three-fourths of the way to the umbilicus and then the doubling up will not occur as in the Alexander operation.

With so many different forms and causes of retrodeviation, I doubt very much if the acceptance of one sign is going to help us very much. It sounds very impressive on paper, but I do not see how it is going to be of much practical help, since the fact that a uterus in a proper position depends on the fact that the cervix is well up. I do not differ with Dr. Sturmdorf because I am not open to conviction. I simply think that there are other factors that are just as much a cause, and of far greater importance.

DR. THOMPSON T. SWEENEY said: It is generally conceded that the uterus is supported by the uterosacral and uteropubic ligament. It is evident that in the erect position, nature has suspended a body from its base, which is a mechanical error. On all fours it is inconceivable that a woman could have a retroversion, since in that position her uterus is suspended from its apex.

I am further interested in Dr. Sturmdorf's paper as it explains so many of the problems of retroversion. One woman physician in Chicago having studied sixty cases of retroversions without symptoms, concluded that this was not necessarily an abnormal position.

These were probably congenital cases in which the pelvic circulation adjusted itself to the malposition. Retroversions with inflammation produce symptoms only when the position interferes with the return of the venous blood. I find a large number of retroversions in young women which produce no symptoms and I have made it a practice to let them alone, making no effort to correct a condition to which the pelvic circulation has adjusted itself.

DR. STURMDORF, in closing the discussion, said: The intimation that I advocate the use of the lumbar index to the exclusion of direct examination in the diagnosis of uterine retroversion, is an unwarranted perversion of my position.

I stated distinctly, that, "*with an index of 25 mm. or less, the existence of congenital retroposition may be predicated in nearly every case, prior to its bimanual verification.*"

The general trend of this discussion, establishes the one fact if nothing more, that congenital uterine retrodisplacement is known in name only: it is this fact among others, that prompted and justifies the present communication.

The article is not merely a hypothetical delineation of mechanical principles, but a contribution of facts based upon a very extensive series of observations.

I utilize the general term uterine retroposition advisedly, dividing the cases into complicated and uncomplicated, because such division is more conducive to clarity than the text-book classification of versions, flexions, retropositions, adherent, nonadherent, etc.

The reference to Reynolds procedure, in foreshortening of the anterior vaginal wall, does not apply to our question, inasmuch as the operation while it may influence a flexed cervix, obviously cannot anteverte a retroverted uterus.

The same applies to all of the other operative measures, which I distinctly stated are applicable to the acquired and not the congenital form of uterine retrodisplacement.

Every woman with marked visceroptosis has a congenitally retroposed uterus, but every woman with a congenitally retroposed uterus does not necessarily present general visceroptosis, at least not clinically.

I am not discussing the relative values and indications of retroposition operations, but the recognition and differentiation of a class of retropositions in which any and all operative intervention is distinctly and imperatively contraindicated.

The method and means advocated for this differentiation are so simple, that the verification or refutation of my statements is within reach of all.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of May 4, 1916.

The President, WILLIAM R. NICHOLSON, M. D., in the Chair.

DR. GEORGE ERETY SHOEMAKER presented the report of two cases

(1) PNEUMOCOCCUS PELVIC ABSCESS.

(2) URINARY RETENTION FROM URETHRAL PRESSURE BY TUMOR OF THE OVARY.*

DISCUSSION.

DR. COLLIN FOULKROD.—The second case opens up a very wide field. We have all had this winter so many cases of infections of this type that it is impossible, unless we go over our records and look up the kind of bacteria and then associate one with the other, to say just what form of germ is causing the epidemic this year. I am very sure I have had streptococcic infection in pregnant women, general in type, which if given a chance to develop in local lesions as in Dr. Shoemaker's case, would have developed into other strains of this organism. I believe that the form of germ changes in the different culture media. The streptococcus is variable in growth and activity and the most virulent in type. Pelvic infections which have been secondary to those general in type open up the question of the primary cause.

DR. BARTON COOKE HIRST.—Dr. Foulkrod has referred to a case of pelvic abscess which I saw six weeks after the woman's delivery. I operated by vaginal puncture and found gonococci to be the infecting organism. The husband said it was not his fault. The patient was a nice young woman and I do not suppose she acquired it in the ordinary way, but she had gonococci in her pelvic abscess nevertheless. I cannot think that they had undergone change in the culture media. This woman had an original gonococcic infection from some source. We cannot expect microorganisms to undergo change from one form to another. The suggestion recalls to my mind an explanation which satisfied the Board of Managers of a Maternity Hospital some years ago, but it would not, I think, satisfy the average medical audience. There was a case of streptococcic infection after labor with fatal result. The Board of Managers called for an explanation, whereupon one of the staff stated to the satisfaction

* For original article see page 660.

of the Board that the Doederlein bacillus normally present in the vagina had undergone a transformation into a streptococcus and that, therefore, nobody was to blame. In one case of generally diffused suppurating pneumococcic infection there was more pus in the abdomen than I have ever seen. Curiously enough, the patient recovered, which is not usual for a case of general suppurative peritonitis. If it had been streptococcic infection recovery could not have been expected. The pneumococcus is not so virulent. I do not think any of those pneumococcic infections are as serious as the streptococcic infections.

In reference to Dr. Shoemaker's other case I once had such a case of obstruction caused by pressure of a vaginal enterocele upon the urethra and bowel.

DR. F. HURST MAIER.—The answer to Dr. Foulkrod's question may be found in the changes that the bacteria, normally inhabiting the genital organs, undergo. Rosenow has demonstrated how the organisms of the streptococcus-pneumococcus group, not only undergo cultural and morphological changes, but mutation in pathogenicity as well.

It is quite possible that the comparative frequency of pneumococcal infections of the pelvic organs this winter, is due to the greater prevalence of throat infections.

In the majority of these conditions, the organisms of the streptococcus-pneumococcus group predominate.

DR. CHARLES S. BARNES.—A month ago I had a puerperal case which was interesting to me and possibly it might be of interest here. Delivery was spontaneous and the puerperium ran a normal course for six days when the temperature suddenly went up. Following that, for a week or ten days the patient ran an ordinary clinical course of puerperal infection. A good bacteriologist made a blood culture but at the end of twenty-four hours he was not able to report what was present. At the end of forty-eight hours pneumococci were all he found from the blood culture. The patient recovered under expectant, stimulating and supportive treatment. Some vaccines were used but I am not sure that they did any good. The infection ran a course without localization. The woman recovered and is able to be about, has no symptoms except slight pain in the right lower quadrant, probably in the region of the right appendage. The case was evidently one of pneumococcic infection. She had not had a catarrhal condition of the air passages the past winter, so I am at a loss to know the course of the infection. The patient says that at one time she was not cleansed properly after defecation and complained of discomfort at the site of suture. I could find nothing locally and the thought was probably a mental aberration upon her part so far as the source of infection is concerned.

DR. SHOEMAKER, closing.—I scarcely think that the organism underwent actual metamorphosis as has been suggested. No doubt, at certain times we see certain organisms developing rapidly in a field, while others are quiet. There is a variation in resistance to

different organisms at different periods as well as a difference in toxicity of the same type of organism. I have heard of a number of pneumococcic abdominal infections this year.

DR. COLLIN FOULKROD reported

A CASE OF KRUKENBURG TUMOR OF THE OVARY.*

DISCUSSION

DR. F. HURST MAIER.—In a paper on the diagnosis of papillary cystoma of the ovary that I read before the Phila. County Medical Society, last year, I cited a case very similar to that reported by Dr. Foulkrod.

The woman had been referred to me by Dr. Scott, of Sea Isle City. She complained only of a moderate ascites and loss of weight. There was no apparent disease of any of her organs, except the ovaries, which were twice their normal size, unusually hard and nodular.

An abdominal incision revealed a carcinoma of the pyloric end of the stomach with metastatic involvement of the ovaries.

Not infrequently we see women whose only complaint is an ascitic distention of obscure origin, as cancer of one of the abdominal viscera, papillary cystoma of the ovary, or tuberculosis of the peritoneum is usually the cause, the necessity for early diagnosis is obvious.

Papillary cystoma of the ovary with its characteristic fixed masses are not likely to be mistaken for the metastatic nodules, of various sizes, disseminated over the pelvic peritoneum, the secondary expression of malignant disease, of the stomach, intestines, etc.

DR. FOULKROD, closing.—Dr. Maier asked if ascites were present. I do not think it was sufficiently pronounced to be diagnosed by external methods. At operation there was an excess of fluid in peritoneal cavity.

DR. F. HURST MAIER presented a paper on

CHRONIC FOCAL INFECTIONS OF THE PELVIC ORGANS AND THEIR RELATION TO SYSTEMIC DISEASE.†

DISCUSSION.

DR. SWITHIN CHANDLER.—We all recognize that if anything is the matter with the uterus or adnexa there is bound to be trouble throughout the system. One point, however, which I think is debatable ground is that with reference to the endometritis. Several years ago in making an examination of the cervix I found that the gonococci were lodged there in great numbers and remained from four to five weeks in virulent form. Specimens examined by Dr. Bloodgood confirmed this finding. In many of the acute cases he examined the endometrium and at the end of three weeks found no trouble whatsoever, nor no gonococci and was not able in a large series of cases to find any gonococci in the uterus after the third

*See original article page 657.

†See original article page 652.

week. He did, however, find gonococci in the cervix as late as six weeks.

In a case of large cystic ovary seen with Dr. Samuel Wilson, after removing the cystic ovary, we found a large mass about 4 inches in diameter and about 6 inches in length. Tracing this out we found it was an obstructed ureter. Removing the ureter and palpating for the kidney we found it the size of a grape-fruit and removed it through an abdominal incision. While the woman was thought probably to have tuberculosis those symptoms have entirely cleared up. Following out the paper of Dr. Maier, it would seem that all such patients ought to have a pelvic examination. It is somewhat difficult, however, to have every woman with systemic trouble to undergo such examination without some obvious cause.

DR. W. WAYNE BABCOCK presented a paper on

THE CORRECTION OF THE OBESE AND RELAXED ABDOMINAL WALL WITH
ESPECIAL REFERENCE TO THE USE OF BURIED SILVER CHAIN.*

DISCUSSION.

DR. BARTON COOKE HIRST.—I have used the old silver wire mat with success. I should certainly prefer this silver chain. It would appear to be a great improvement upon anything I have ever seen or heard of before.

DR. EDWARD A. SCHUMANN.—I would suggest relative to the illustration of Dr. Babcock's operation for suspension of the uterus that the use of silver chain be limited to women beyond the age of pregnancy, because there would be some little difficulty with that chain otherwise.

DR. WILLIAM R. NICHOLSON.—Will Dr. Babcock give us his experience with the use of the chain in infected wounds, if he has had such experience?

DR. BABCOCK.—The point made by Dr. Schumann is very well taken. Of course, it is entirely obvious that the chain cannot be used in the child-bearing woman without incurring some risk.

Regarding the use of the chain in infected wounds. In one case in which the wound broke down, a part of the chain healed in. The infection was in the subcutaneous fat and the incision was 6 inches long. A half-inch opening was made in two places, and several ounces of pus were discharged. We picked out some of the chain, leaving some strands in. Finally firm healing occurred and the x-ray showed a mass of chain in the lower part of the wound which has given no clinical symptoms.

Tying a knot in the chain makes rather too great a bulk, but this may be overcome by the use of a staple, or link improvised of silver wire.

DR. WALT PONDER CONAWAY presented papers on

(1) A CASE OF VESICO-UTERO-VAGINAL FISTULA.

Mrs. Isaac G., age thirty-nine, para-iii, was delivered of a seven-pound baby on May 4, 1915 by forceps. A slight laceration of the

* See original article page 596.

pelvic floor was noticed. This was repaired promptly. A few days later the patient found that the urine seemed to be dribbling nearly all of the time and that also there was odor of fecal matter about the vagina constantly. I was called in consultation on May 15 and after examination made a diagnosis of vesico-utero-vaginal fistula and recto-vaginal fistula and advised operation.

She was admitted to the Atlantic City Hospital on May 19, 1915, and I operated on May 20. The bladder opening was closed with interrupted sutures of fine silk in two layers. The uterus was curetted and a high trachelorrhaphy was done, which extended up to the vesical opening. A permanent catheter was left in the urethra.

The recto-vaginal opening was repaired with interrupted sutures of fine silk in the rectal mucous membrane, chromic catgut sutures in the pelvic floor muscles and plain catgut in the vaginal mucous membrane.

On the fourth day the patient developed a high fever and other evidences of cystitis. The catheter was removed and the bladder irrigated a few times with a solution of boric acid. She was catheterized regularly for several days until the cystitis subsided and then another permanent catheter was inserted. This remained for a week. The patient was kept in bed for four weeks at the end of which time she was able to void urine with but slight leakage in the vagina. This leakage occurred only at the time of urination. She was able to retain her urine for four hours. In two weeks more the closure was perfect. The repair of the recto-vaginal fistula was complete and gave no further trouble. In September, I heard from the husband of the patient who stated that his wife had no trouble with the bladder or bowels and that she was well.

(2) A CASE OF UTERUS DIDELPHUS.

Margaret P., age thirty-two years, called at my office for examination on January 20, 1916. Family history negative. Patient was a native of Italy but had lived in this country for twenty years. Had the usual diseases of childhood but since that time had never been ill and had never lost any time from her work as bookkeeper for twelve years. She had never menstruated and had never seen any discharge of any kind from the vagina.

Vaginal examination was unsatisfactory as there was practically no vagina, only a slight depression between the labia about one inch in depth and large enough to admit one small finger. An opening large enough to admit a probe could not be found and a bimanual examination revealed nothing behind the pubes; but a mass about the size of a lemon could be diagnosticated through the abdominal wall on the left side, low down in the pelvis. Tenderness was present over McBurney's point.

Since she gave a history of two attacks of appendicitis I advised laparotomy and also because she was quite anxious to menstruate and was willing to be operated in hopes of being relieved.

A laparotomy was performed on February 11.

On opening the abdomen I found a normal tube and ovary on the left side, a small uterus imbedded in the broad ligament and with its cervix pointing to the left hip. On the right side was a normal tube but a large cystic ovary about the size of a lemon. On this side was another small uterus about one and a half inches long, perfectly formed and its cervix pointing outward toward the right hip. Between these two uteri was an empty space partly filled by the bladder. They were connected by a muscular band about one inch wide and about four inches long and which seemed to contain the uterosacral ligaments and the vesical fold of peritoneum. A perfectly formed cervix could be felt through the peritoneum and in the broad ligament. Neither cervix communicated with the vagina. The appendix was considerably enlarged and adherent and was removed with some difficulty.

In Gould and Pyles' book, "Anomalies and Curiosities of Medicine," I find mention is made of a few very similar cases.

DISCUSSION.

DR. COLLIN FOULKROD.—I have had one or two such cases, though not of the exact type as that reported by Dr. Conaway, with the septum reaching from the vagina up to the fundus of the uterus. In one case the woman was pregnant with that type uterus—pregnant in one side of a double uterus and double vagina. Not recognizing the condition we examined in the wrong vagina and it seemed as if there were no chance of the child's head getting into the vagina. Preparations were made for Cesarean section, when it was found that the septum was so stretched over the child's head that we could not find the entrance to the vaginal canal through which the head was coming until the scalp emerged at the vaginal outlet after tearing the septum part way up from below.

DR. EDWARD A. SCHUMANN.—Dr. Conaway's case is of such unusual interest that some emphasis should be laid upon it. Double uterus is a well-recognized anomaly, but double uterus with complete closure of the anterior segment cloaca is most unusual and an embryological anomaly which should be of the greatest interest.

DR. F. HURST MAIER.—I recall just such a case of double uterus without a vagina as one of my early operative experiences. The woman suffered dreadfully from menstrual molimina each month. Examination through the rectum revealed a mass, the size of an orange, in the left half of the pelvis. Operation demonstrated the absence of the vagina, as well as, the right ovary and tube. Development in that side had only taken place in that part of the Mullerian duct that formed the uterus. The ovary, tube, and uterus of the left side were present, the latter in the guise of a hematometro-salpinx. The structures were removed and a vagina made of flaps formed from the labia minora.

DR. BARTON COOKE HIRST.—I agree with Dr. Schumann that this rare case should be emphasized. I have seen almost every other variety of abnormality of the genital organs but I have never seen a double uterus without a vagina.

DRS. PHILIP F. WILLIAMS and JOHN A. KOLMER presented a paper on

THE WASSERMANN REACTION IN GYNECOLOGY.*

DISCUSSION.

DR. DANIELS.—I should like to mention a case upon which I did an abdominal section which emphasizes the importance of the Wassermann reaction in some of these cases. The woman was forty-eight years of age whom I thought had chronic appendicitis because of persistent pain and tenderness on the right side of the lower abdomen. She had chronic gastrointestinal disturbance with loss of weight. I thought that the mass which I could feel through the abdominal wall was due to some inflammatory condition. I opened the abdomen and found a tumor the size of a large pear involving the wall of the four loops of the small intestine and situated in the ileocecal region. I thought the condition was carcinomatous and closed the abdomen. Dr. Mann suggested that the condition might be syphilitic. While I thought it was not I realized that anti-syphilitic treatment could do no harm. The patient was put upon iodid of mercury and iodid of potash, when the symptoms entirely disappeared. The tumor, so far as I could feel through the abdominal wall disappeared, and the woman has gained from 20 to 30 pounds in weight and at the present time is well. Had I been wise enough to have had a Wassermann test made at first an abdominal section would not have been necessary.

DR. BROOKE M. ANSPACH.—I want to congratulate Drs. Williams and Kolmer upon this paper which represents a great deal of hard work. In the Gyncecan Hospital we have had a number of cases which demonstrated the value of the Wassermann reaction in gynecology.

GAUZE REMOVED FROM THE PERITONEAL CAVITY SEVENTEEN YEARS AFTER A HYSTERECTOMY.

DR. STEPHEN E. TRACY.—The first specimen shows a piece of encapsulated gauze removed from the peritoneal cavity seventeen years after an hysterectomy. Mrs. C. H., aged forty-five, para-i, was referred to my service at the Stetson Hospital because of pain and discomfort due to a mass about the size of a large grape-fruit in the left hypochondriac region. Manipulation of the mass, which was only slightly movable, caused the patient considerable discomfort. She had been somewhat constipated, but there had been no difficulty in securing free evacuations. The tumor mass became smaller after colonic lavage or a brisk cathartic. Pyelography

* See original article page 638.

showed the kidney in its normal position. The röntgenologist diagnosed the lesion a tumor pressing on the bowel. The clinical diagnosis was carcinoma of the descending colon. At operation it was found that the tumor consisted of a portion of the transverse colon, the splenic flexure and the upper portion of the descending colon with the omentum wrapped about and adherent. The large mass was enucleated, the transverse colon divided about its middle, and the descending colon at its lower end. An anastomosis was performed and the operation completed in the usual way. When the bowel was opened it was found there was a round opening about 2 cm. in diameter which communicated with the large pus cavity. The edges of the opening were smooth and rounded. Projecting from the cavity about 1 cm. through the opening into the bowel was a piece of gauze. The gauze was in a good state of preservation, and had caused no trouble until a few months before its removal. The patient had had an hysterectomy for inflammatory disease of the pelvic organs seventeen years before.

Second specimen consists of half the transverse colon, the splenic flexure and all the descending colon, removed for a

CARCINOMA OF THE DESCENDING COLON.

The patient was forty-seven years old, the mother of one child. She complained of cramp-like pains in the stomach and of fulness in the left side of the lower abdomen. In the last six months she had lost 15 pounds. Examination showed a mass about the size of a large orange, which was fixed and situated on the left side 5 cm. above the brim of the pelvis. This mass had been diagnosed as a displaced kidney by a leading internist who ordered an abdominal support, which aggravated the discomfort. Pyclography eliminated the kidney. The röntgenologist stated that the transverse colon was adherent to the lower portion of the descending colon, and that he could not obtain a shadow between the middle of the transverse colon and the upper end of the sigmoid. Clinical diagnosis was carcinoma of the descending colon. At operation it was found that a loop of the transverse colon was adherent to the cancerous mass in the descending colon. The colon was removed from about 7 cm. beyond the hepatic flexure to the upper portion of the sigmoid.

The third specimen shows the lower ileum, cecum, appendix, ascending and transverse colon. This was removed from a single woman, aged twenty-six, who had been sent to the hospital with a diagnosis of chronic appendicitis. The patient stated she had had more or less discomfort in the side for a period of six months. Examination showed considerable tenderness in the right side of the abdomen especially in the right iliac fossa. When the abdomen was opened it was found that the lower end of the ileum was dilated, the cecum greatly infiltrated, and at one point the lumen was almost obstructed. This infiltration extended as far around as the first portion of the transverse colon. It was a question what should be done as the nature of the lesion could not be determined. Nor do I know at this time, as the histological examination has not been

made; operation being performed only a few days ago. It was decided, however, to remove all the involved tissue. Several centimeters of the lower ileum, appendix, cecum, ascending colon, and the first portion of the transverse colon were removed. The transverse colon at this point was not infiltrated. When an attempt was made to anastomosis the ileum in the side of the transverse colon, the forceps cut through and it was necessary to remove the transverse colon as far as the splenic flexure. The ileum was then anastomosed to the lower portion of the descending colon.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of February 11, 1916.

The Vice-President, DR. WILLSON, in the Chair.

DR. LOWE reported a case of

PYELITIS OF PREGNANCY.

DISCUSSION.

DR. MORAN had seen three similar cases in the last six months. In the first the pain had subsided on doing an external version; in the second, the woman had had two prior stormy pregnancies in which the pyelitis had cleared up before labor under symptomatic treatment; in the third case the diagnosis of appendicitis had been made, the white blood cell count had been 30,000, there had been chills and fever two days before labor. After labor all the symptoms had cleared up, as was usual in all the cases he had seen. The colon bacillus was the cause of most of the infections. The question of ending the pregnancy came up frequently as most of the cases developed in the seventh month.

DR. STONE said the condition of the kidneys determined the course of action in each case. A high temperature with increasing leukocyte count suggested involvement of both kidneys.

DR. ABBÉ reported a case where a woman giving symptoms of renal colic in the fifth month of pregnancy had recently brought before his mind the question of pyelitis. Her symptoms persisted for a few days and then cleared up. A week later the woman presented him with a calculus the size of a pea which she had passed in her urine. He raised the question as to whether certain other cases that cleared up completely might not also be due to calculus.

DR. LOWE said that two deaths has been reported from pyelitis, one of gonococcal origin and one from typhoid. Colon bacillus infection caused 85 per cent. of the cases. The condition seems more frequent on the right side, which might be explained by the

pressure of the child's forehead on the right ureter at the pelvic brim. Some of the cases did not clear up after labor but later came to operation.

DR. STONE asked if fibroid masses could not give a similar pressure on the ureter. He had not seen pyelitis complicating fibroids.

DR. VAUGHAN reported a case of

STONE IN THE BLADDER.

Appearing two years after a laparotomy. The stone had a silk ligature knot as its nucleus.

DR. STONE reported another case of silk knot in the wall of the bladder, and noted the possibility of palpating a vesical calculus from the vagina.

Meeting of March 10, 1916.

The President, DR. MILLER, in the Chair.

DR. D. W. PRENTISS read a paper on

SYPHILIS OF THE UTERUS.*

DISCUSSION.

DR. MOULDEN said the spirochetæ could not live in an acid medium and therefore were not apt to infect vaginal or cervical mucosa.

DR. WHITE suggested that a routine blood examination of all women with cervical lesions would show many cases of syphilis.

Meeting of April 9, 1916.

The Vice-President, DR. WILLSON, in the Chair.

DR. GRASTY reported a case of

ACUTE LYMPHATIC LEUKEMIA IN A CHILD.†

DR. PRENTISS WILLSON gave the histories of four cases of

VAGINAL DELIVERY SUBSEQUENT TO CESAREAN SECTION.

One of the most important problems of present-day obstetrics is that of the proper indications for Cesarean section. The literature shows clearly that professional opinion on this subject is in the formative stage. There can be no doubt that the operation is being done far too frequently at the present time, its very safety under aseptic

* See original article page 480.

† See original article page 669.

conditions being, doubtless, largely responsible. On the other hand, I am firmly convinced that in some clinics an undue emphasis is being placed on the restriction of the indication to cases of serious disproportion. In the ultimate decision of this vexed question, which it is quite likely will be on the usual middle ground, the fate in subsequent pregnancies of the Cesareanized patient with a normal pelvis, will be a strong deciding factor. According to John T. Williams, who has just reported two successful cases of vaginal delivery subsequent to Cesarean section, v. Leeuwen found only thirty-two such cases in the literature up to 1904. Williams found six cases in the literature since 1904 and reported two cases of his own, making forty cases in all reported up to the present time. To this number I wish to add the reports of four cases which have come under my own observation.

CASE I.—N. D. W., married, white, para-iv, normal pelvis. On the 13th of May, 1913, this patient's fourth pregnancy was terminated at the thirty-fifth week, the indication being partial placenta previa, and a strong desire for a living child decided me to do Cesarean section. The following September she became pregnant and on the 7th of June, 1914, at full term, and following a perfectly normal pregnancy, she delivered herself of a male child weighing 6 pounds and 14 ounces. The labor was easy and normal and lasted seven hours. Since this time she has been in excellent health.

CASE II.—J. W., married, white, para-ii, thirty-six years of age, normal pelvis. This patient's first pregnancy was terminated by Cesarean section at full term, the indication being antepartum eclampsia in a thirty-five-year-old primipara. Convalescence was complicated by an abscess in the uterine incision which opened and drained through the vagina. When, about a year later, the patient presented herself halfway through her second pregnancy, I regarded the case as one of more than ordinary interest. The lower part of the birth canal was that of a thirty-six-year-old primipara, having never been dilated by the passage of a baby, while the uterine wall, which one would wish to have in as strong a condition as possible under such circumstances, was weakened by the presence of the scar of a previous Cesarean section which had been the site of infection at the time of its formation. The patient was admitted to the hospital at 11 P.M. on August 29, 1914, having been in labor for two hours. She was at full term. The position was R. O. P. The first stage lasted for five hours. With the aid of the knee-chest position the occiput rotated spontaneously. At the end of two and one-half hours of hard second-stage pains without material progress it was decided to intervene and a male infant weighing 7 pounds and 14 ounces was delivered by midforceps, the indication being undue resistance of the soft structures of the lower birth canal. The mother and baby left the hospital in good condition. It is interesting to note in this case that the second baby succumbed to tuberculosis contracted from a tubercular father before it reached the age of one year. Had the first child been delivered by any method except abdominal section the chances are that it would have

been lost during birth. The husband died a short time before the death of the second child and it is therefore obvious that less consideration of the fetus at the time of the first delivery might well have left this woman widowed and childless.

CASE III.—R. W., married, white, para-iv, thirty-three years of age, normal pelvis. This patient's first labor was complicated by eclampsia and the baby was lost during forceps delivery. The second labor was normal and the baby lived. The third labor was terminated by Cesarean section at term for the following indications: Threatened eclampsia, large fetus entirely above the brim of the pelvis and prolapse of the cord, with the escape of meconium stained amniotic fluid. This operation was in December, 1911. The fourth pregnancy terminated in normal labor three years later. The patient was at term. She went in to labor at 6 A.M. December 2, 1914. Position L. O. A. The first stage lasted six hours and a half, the second three hours. The child weighed 8 pounds and 9 ounces, and was delivered spontaneously.

CASE IV.—O. B., married, white, para-iii, normal pelvis, thirty-two years of age. The first pregnancy terminated in premature labor at the seventh month, cause unknown. The second pregnancy was terminated by Cesarean section at the seventh month for eclampsia. About eighteen months after this operation the patient was delivered by low forceps of a male infant weighing 7 pounds and 14 ounces. She was at term. Labor lasted a little less than six hours. The indication for the forceps delivery was obstruction of the head at the outlet of the pelvis by the prominence of the tip of the sacrum.

DISCUSSION.

DR. MORAN said there was but one positive indication for Cesarean section, a disproportion between the size of the child and the pelvis of the mother. With eclampsia or placenta previa the necessity for section was determined by the judgment of the physician to a much larger extent than in the cases of disproportion. Disproportion might be present if a comparatively small head failed to mold. In certain cases the indication for Cesarean section which was present at the time of the first confinement might be absent at a later one.

DR. SULLIVAN spoke of a recent symposium at which the dictum was announced: "Once a Cesarean, always a Cesarean." Such a tenet could be modified to the extent of allowing a patient after a first Cesarean to spend the last weeks of each subsequent pregnancy in the hospital where she might be allowed to try a couple of hours of labor. Some years ago he had done a Cesarean for eclampsia, and all had gone well except that on the fourth day all the chromic gut sutures which had been used as through-and-through sutures in the uterine wall were passed in the lochia with the knots still tied. In that case he would watch most anxiously for rupture at any subsequent pregnancy. Van Horn and Sawtell say that catgut in the uterus and in the perineum is absorbed during the puerperium just twice as quickly as at other times.

DR. LOWE had seen ten or twelve women who had gone through normal vaginal delivery after having had a Cesarean. Some had easy labors even though the pelvic measurements were small.

DR. WILLSON, in closing, spoke of the chance of rupture of the uterus as grossly exaggerated. The literature recorded forty cases of rupture in labor after Cesarean, and apparently only forty cases of subsequent normal vaginal birth. Such a percentage was obviously erroneous, as the normal births were seldom reported.

DR. RIGGLES presented a paper on

CONVULSIONS CAUSED BY PELVIC DISEASE.*

DISCUSSION.

DR. STONE said true epilepsy was not benefited by ovariectomy. He had one case of hysteroepilepsy where a movable kidney had been fixed and a lacerated cervix repaired; the woman rejuvenated and all her seizures ceased. Neurasthenia due to pelvic conditions was often curable by operation, but not always.

REVIEWS.

MANUAL OF OPERATIVE SURGERY. By JOHN FAIRBAIRN BINNIE, A. M., C. M. (Aberdeen), F. A. C. S. Surgeon to the Christian Church, the German and the General Hospitals, Kansas City, Mo.; Fellow of the American Surgical Association; Membre de societe internationale de chirurgie and of the Western Surgical Association. Seventh Edition, revised and enlarged. Pp. 1363. With 1597 illustrations, a number of which are printed in colors Philadelphia: P. Blakiston's Son & Company, 1916. Price \$7.50, net.

It gives us great pleasure to welcome the seventh edition of Dr. Binnie's remarkable Manual, which has become for all surgeons a classic and accepted authority. It still maintains its original position as a text-book which places its emphasis on the uncommon rather than the common, and so remains, to those who are fortunate enough to possess it, "an ever present help in time of trouble." The new edition shows thorough revision and is well up to date. Several chapters have been rewritten, obsolete illustrations discarded, new figures inserted, and several new chapters added. In spite of all this the size of the volume has not been materially increased as pruning has been judicious and careful. Paper, type and presswork are excellent.

* See original article, page 662.

MANUAL OF VITAL FUNCTION TESTING METHODS AND THEIR INTERPRETATION. By WILFRED M. BARTON, M. D., Associate Professor of Medicine, Medical Department, Georgetown University, Attending Physician to Georgetown University Hospital and Washington Asylum Hospital. Pp. 225. Boston; Richard G. Badger, 1916.

Dr. Barton has performed a real service to the clinician in bringing together in compact form the vital function testing methods scattered through the recent literature. An estimation of the significance and reliability of the tests helps to assign to each its real value. Of the methods for estimating the functional capacity of the liver the writer lays especial emphasis upon the phenoltetrachlorophthalein test. He regards the phenolsulphonephthalein test as the most valuable and reliable for kidney function. The subject of pancreatic function is complicated. The author describes the tests for this without guarantee of their conclusiveness. In discussing the tests of heart function the writer does not minimize the value of instrumental study and numerical changes at the time of exercise tests; but he emphasizes the greater importance of the general appearance and condition of the patient, the rapidity of recovery after exercise, and freedom from nervousness, irritability, cough and insomnia during the next twenty-four hours. The volume closes with a discussion of the ductless glands and their functional tests.

THE PRACTITIONER'S MEDICAL DICTIONARY, containing all the Words and Phrases Generally Used in Medicine and the Allied Sciences, with Their Proper Pronunciation, Derivation, and Definition. By GEORGE M. GOULD, A. M., M. D., Author of "An Illustrated Dictionary of Medicine, Biology, and Allied Sciences," etc., etc. Third Edition, Revised and Enlarged. By R. J. E. SCOTT, M. A., B. C. L., M. D., Editor of Hughes' "Practice of Medicine," etc. Based on recent medical literature. Pp. 962, with many tables. Philadelphia: P. Blakiston's Son & Co., 1916.

Although containing nearly 71,000 terms, 20,000 having been added to the previous edition, this volume is noteworthy for its compactness. Thin paper, small type, and the omission of nearly all illustrations have made possible the production of a book which weighs only three-fifths as much as similar dictionaries. The eponymic terms are placed in their alphabetical order. The alphabetical sound of the letter is the key to pronunciation employed. A diacritic mark is used only when there may be doubt. Simplicity and convenience are obvious characteristics of the book; accuracy and reliability are vouched for by the editor and publisher.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Accidents Occurring in the Rupture or Abortion of Simultaneous Tubal Pregnancies.—R. Prouest and A. Buquet (*Rev. de gyn. et de chir. abd.*, vol. xxiii, part 5, 1915) says that Schauta divides tubal pregnancy with multiple fecundation thus: (a) simultaneous extra- and intrauterine, the most frequent; (b) twin pregnancies in the same tube; (c) bilateral tubal pregnancies, the rarest. We should distinguish successive and simultaneous pregnancies. The most frequent, the successive, give at operation the impression of bilateral pregnancies. They appear simultaneous, but one pregnancy has followed the other, the first pregnancy having become arrested by a hematosalpinx, a hematocele, or the occurrence of a lithopedion, without the necessity of an operation. The operation occurs later after the occurrence of a second tubal pregnancy. The histological examination of the specimen alone can tell whether the two pregnancies were actually simultaneous. The author has observed and gives the history of an undoubted simultaneous case. One of the difficult points in diagnosis is that the severe pain exists only at the site of the tube that has just aborted. The author has collected all the similar cases reported and gives their histories. The diagnosis should be established as to bilaterality and simultaneity. When the fetus is not apparent only the histological examination can establish bilaterality; there must be the presence of chorionic villi on both sides. The first cause of error will be the possible existence of a pregnancy or a slight salpingitis. Most certainty obtains when the fetus can be seen on each side. To establish simultaneity we must have microscopic and macroscopic lesions alike, and the clinical symptoms must be those of tubal pregnancy terminated in both sides by abortions at about the same period. The dimensions of the fetus should be the same on both sides. Thirty-three observations are collected that appear authentic.

Modern Conceptions of Induced Premature Labor for Pelvic Deformity.—Giuseppe Guiceardi (*Ann. di ost. e gin.*, Jan. 31, 1916) discusses the desirability of inducing premature labor for delivery in contracted pelvis. The material on which he bases his conclusions is derived from the records of the maternity at the "Seuola Ostetrica di Vinezia," from the year 1900 to the present time. From these records the author collected all cases in which premature labor was induced, and also all other cases of moderate contraction of the pelvis which were delivered at the clinic by whatever means. These latter he compares with those in which premature labor was induced as to the results of the procedure with reference to the life and health of the mother and of the infant. He concludes that for social and technical reasons the induction of premature labor should be abandoned for delivery of the infant in contracted pelvis in

hospitals, and in private practice it should be limited. Exceptions should be made only in primiparæ, the first labor being regarded as an experiment of the possibilities for delivery. It should never be used in pelves of greater contraction than 8.5 cm. diameter. The ideal method of delivery is spontaneous evolution, but it is not destitute of danger for the child. The expulsion of the fetus may be so slow as to cause with the increased pressure on the skull, injurious effects on the brain and spinal cord. Measures to increase uterine action may be fatal to the child. The best adjuvant to the expulsive efforts is the forceps, in well selected cases and applied without undue pressure. The best dilator is that of Ternier. Difficulty of dilatation may be a good reason for abandoning the delivery by the genital passages. Version may be very hazardous, since it closes all other ways of delivery. It should be rejected. Embryotomy on the living fetus should never be done. With a dead fetus and septic conditions present it is justifiable. The Cesarean section is a method of election with a healthy mother and living fetus in impervious pelvis. There is little fear of rupture of the scar in later pregnancy if good technic is used in closing the wound. Pubiotomy is in disuse at present. When the permeability of the pelvis is doubtful and there exist especially favorable conditions, maternal and fetal, so that the passage by the genital route is not excluded we may assist the expulsive efforts. Failing in this, and an attempt at extraction having been unsuccessful, the classical Cesarean section may be done, but the suprasymphyseal section finds here its most precise and rational indications. We must act so as to bring into the world a well-developed, healthy, undamaged infant, and leave a strong healthy mother to care for it.

Histochemical Studies of the Function of the Placenta.—Attilio Gentili (*Ann. di ost. e gin.*, Feb. 29, 1916) has made an exhaustive study of the histology and chemistry of the placenta, in order to learn its functions. He gives his conclusions as follows: The decidual cells possess as an essential function the elaboration of lipid substances belonging to the group of phosphatids, cerebrocides, and cholesterins. This function resides especially in the substance of the epithelial cells, with a predominance of formation of cholesterin during the early part of pregnancy, and in other cells there is a predominance of lecithin. In later pregnancy these elements diminish. Under the action of toxic and infective stimuli the decidual cells increase this essential function and elaborate lipid substances in very large quantity, especially cholesterin. In the placenta of the cow the uterine cells become transformed into decidual cells and possess throughout pregnancy this power of elaborating lipid substances. In woman no production of lipoids is found in the epithelial or glandular cells outside of pregnancy. The lipid function is in exact correlation with the cellular vitality. When these elements retrograde there may even be fatty degeneration. This is seen in later pregnancy in the outer cells of the placenta. The presence of lipoids in the protoplasm and in the intercellular spaces indicates the way of elimination of the lipoids themselves.

This is characteristic of the endocrinoid function. Even the endothelial cells of the vessels partake of this power of being transformed into lipoids.

Determination of Sex.—In a series of 1000 cases J. S. Freeborn (*Can. Pract.*, 1916, xli, 236) correctly diagnosed the sex of the child previous to birth in about 97½ per cent. by noting the occurrence of the date of conception in the first or second half of the intermenstrual period. Conception occurred for females on an average of 5⅓ days after the last menstruation; for males, on an average of 19 days after the last normal menstruation. Freeborn believes the sex is fixed at the time fertilization takes place and that the ovum determines the sex independent of any inherent quality of the spermatozoon, and that all ova maturing in the first half of the intermenstrual period are female-producing ova and those maturing later are male-producing ova. The patient should limit marital relations to the first ten days after the menses for girls, and for boys confine it to the last ten days of the intermenstrual period.

Twilight Sleep.—Reporting a series of 1000 cases, C. B. Reed (*Surg., Gyn. and Obst.*, 1916, xxii, 656) believes the treatment has been successful since 29 per cent. of his cases were practically, and 56 per cent. entirely, free from pain—or 85 per cent. in all. Strength is conserved and the convalescent period shortened. Whether or not the woman gets up earlier is a question of uterine involution rather than one of days or strength or treatment. The main thing is that she feels better much sooner. Primary pain weakness, hemorrhage, prolapsed cord, and a lack of correlation between the size of the pelvis and the child, make conditions that are unfavorable for “twilight sleep.” “Twilight sleep” does no harm when properly used and will act happily in about 85 per cent. of the cases that are selected with due regard to the contraindications.

Wassermann Reaction in Pregnancy.—A. M. Judd (*Amer. Jour. Med. Sci.*, 1916, cli, 836) says that of 892 Wassermann tests 821 were negative and 71 positive (7.9 per cent.). Treatment of the mother during pregnancy gives a negative reaction in the infant, but one negative does not necessarily mean that the infant is all right and can be suckled by a healthy wet-nurse, as syphilis may be latent. Probably one need have little fear for the child if the mother is negative. Of congenital syphilis it may be said that practically all infants or children showing symptoms give positive reactions, but not all children born of syphilitic mothers; while of living children born of syphilitic mothers nearly 50 per cent. give a negative reaction. If the child has been delivered after an anesthetic has been given to the mother the blood of either the mother or child must not be examined for a full twenty-four hours after delivery, as the results may be erroneous. The same holds true regarding the ingestion of alcohol by the mother. The author differs in his opinion from those who state that the existence of pregnancy is a contraindication to the use of salvarsan and adopts the attitude that because of the rapidity of its action it seems especially suited to syphilitic pregnant women with a view to the prevention of abortion and the delivery of a sound child.

Pyelitis of Pregnancy.—In order to determine what relation might exist between the bacteria present in the bladders of normal pregnant women and the pyelitis of pregnancy, the following observations were undertaken by W. C. Danforth (*Surg., Gyn. and Obst.*, 1916, xxii, 723). The urine was obtained from the bladders of twenty normal gravidæ. Thirty-two showed a pure growth of staphylococcus. Two showed a pure culture of colon bacillus. Three gave a growth of colon bacillus and staphylococcus, while thirteen gave no growth. Colon bacillus, therefore, was found in pure culture, or mixed with staphylococcus in five cases. In a second series of fourteen cultures there were found staphylococci in seven cases. One case gave a growth of pseudodiphtheria, and one case gave a growth of a spore-forming bacillus positive to gram stain, motile, and having an acid reaction in dextrose-agar growth, showing no reaction in lactose agar, mannit agar, and litmus milk. Specimens of urine obtained by means of the ureteral catheter from two cases of pyelitis of pregnancy gave a pure growth of colon bacillus. It is highly probable that the staphylococcus, which is so frequently found in the urine of gravidæ, is an organism of a very low degree of virulence. As to the question of the mode of entrance of the colon bacillus into the pelvis of the kidney, the writer believes that the infection is a blood-borne one.

GYNECOLOGY AND ABDOMINAL SURGERY.

Bloodless Operation for Correction of Double Uterus and Vagina.

—A. E. Rockey (*Annals Surg.*, 1916, lxiii, 615) describes his treatment of such a case. After division with scissors of the vaginal septum between two long straight broad-ligament clamps and demonstration of the presence of a complete septum in the uterus, the cervixes were separately dilated with a small uterine dilator. This permitted the introduction across the septum of the blades of a full length curved clamp forceps, which was then firmly locked into place, compressing the septum. All three clamps were allowed to remain in place for thirty-six hours, and were then removed. The compressed septum soon sloughed out, and healed completely, leaving a single uterus and vagina, that were normal in appearance. The patient subsequently gave birth to four healthy children. The existence of a possible bicornate uterus with a wide low divergence of the bodies should be predetermined. In such a case it might be advisable, after introducing the separate blades of the long curved clamp into the cavities, to raise the table to the Trendelenburg position, and close the clamp very slowly to avoid any possible injury by catching the intestine between the approximated uterine bodies.

Emetine in Severe Dysmenorrhea Associated with Thyroid Dyscrasia.—A patient of H. R. Harrower (*Pac. Med. Jour.*, 1916, lix, 306), a woman of twenty-five who had menstruated regularly for ten years, developed severe dysmenorrhea and a slight swelling of the thyroid of fifteen months' duration. Later, she noticed some pain in her gums and slight bleeding after using the toothbrush. Examination showed a very moderate and somewhat localized

alveolitis, and she was thereupon given a local antiseptic wash containing emetine and three injections of a half grain of emetine hydrochloride at three-day intervals. The pyorrhea, if it can be so called, cleared up, the thyroid was noticeably diminished in size and the menstrual phenomena, due a day or two after the third emetine injection were markedly changed for the better. Seven injections in all were given. At present there is neither goiter nor dysmenorrhea. The patient was apparently suffering from endamebiasis, probably of the tonsillar crypts, and this condition was sufficient to be a constant source of irritation to the thyroid and was probably the direct cause of its enlargement and dysfunction, and also by the hormone reflex of the thyroid upon the ovaries was the indirect cause of the dysmenorrhea.

After Laparotomy.—Emile Forgue (*Ann. de gyn. et d'obstet.*, March-Apr., 1916) gives his conception of the dangers of the third day after laparotomy. This is the critical day on which a peritonitis may declare itself, ushered in by abundant mucous vomiting, no escape of gas, meteorism, a typical facies, etc. The condition may be due to one of three things: peritoneal infection, obstruction of the intestines, or arteriomesenteric occlusion of the duodenum. Differential diagnosis must be made by the physician. Mechanical obstruction would appear from the eighth to the fifteenth day, and its evolution is slow. Postoperative ileus has become much less frequent than formerly since the era of asepsis. If peristaltic movements of the intestines are not seen there is intestinal paralysis due to general peritonitis: if we can see the peristalsis struggling against an obstacle there is obstruction of mechanical nature. If we have a pure peritonitis the treatment consists of Fowler position, the Murphy drip, and camphorated oil in large doses to sustain the heart. If vomiting predominates lavage of the stomach is useful. Intestinal occlusion may come as early as the third day and calls for immediate opening of the abdominal wound. The sooner this is done the better the chance of recovery. If the obstacle cannot be found an enterostomy should be done. Dilatation of the stomach with arteriomesenteric occlusion of the duodenum may occur from the third day on, especially after a long operation with much handling of the intestines. Lavage of the stomach and change of position may work wonders. On the fourth day if all goes well we may begin milk diet, with soups. At the end of the first week a progressive return to normal diet may begin. Embolism has not been reduced in frequency by asepsis, nor good operative technic. It may occur early, but is apt to come at the end of two or three weeks. According to some the early rising from bed lessens its frequency. In cases of phlegmasia alba dolens embolism rarely occurs, because it comes generally from the hidden abdominal clot rather than from superficial ones. Embolism occurs especially after operations for fibroma uteri, cancer, and ovarian cysts. Its advent is rapid and it is generally fatal. Preventive measures are the use of citric acid and urotropin. Constipation and overfeeding should be guarded against. If a phlebitis appears immobilization of the limb in cotton should be carried out rigidly.

Mechanism of Menstruation.—Henri Vignes (*Ann. de gyn. et d'obst.*, Jan.—Feb. and March—Apr., 1916) says that attempts have been made to isolate the hormones which cause the hyperemiant action of the ovary upon the uterus. The lipoids of the ovary have been extracted and injected into animals, also that of the corpus luteum. The author thinks that the effects of the lipoid may be due rather to certain substances that the lipoids fix, than to themselves. In his experiments he took the synthetic method, and made extracts soluble in water which were found to be inactive but when associated with cholesterin they became active. The ovarian phosphatids alone or with cholesterin are very active. Ovolecithin has the same property. The active substance of the corpus luteum is probably lecithin. Lipoids soluble in acetone are not active either alone or with ovolecithin. The effect of the injection of cholesterin is not easy of explanation; either it has a specific action or determines a modification of metabolism, which in its turn causes a hyperproduction of the hyperemiant principle; or lastly there is a biological antagonism between lecithin and cholesterin, which liberates the genital lecithides. Thus the ovary provokes menstruation by a humoral mechanism. We are ignorant of the nature and genesis of the ovarian hormones. They have never been isolated. Perhaps, instead of one ovarian secretion there are a series of secretions. There is a toxicity of the genital glands and their products. The author has experimented on the toxicity of various extracts with the result that he concludes that the heated extracts of the ova have a toxic action similar to that of the ovary itself, showing itself by a slow loss of tension. The ovary is extremely sensitive to intoxications. The ovules degenerate in the presence of autotoxic substances. This is not only pathological but physiological, and is in relation with the genital function. The poisons contained in the ovum disappear during the first embryonic phases. The appearance of these substances in the organism is correlative with the development of the genital glands. The poisons fabricated by these glands enter the blood by the mechanism of internal secretion, and when the ovary becomes active they become fixed on the germinative cells to contribute to the formation and development of the ovum. It is probable that these poisons play an important part in ovogenesis and the development of the embryo. Perhaps they constitute a material substratum of heredity and serve to transmit chemical characteristics to the species. The corpus luteum is formed of cells rich in lipoids. The fats of the corpus luteum take on the histochemical characteristics of lipoids, and increase in the follicular cells with the maturation of the ovum, and in the ovarian cells in the course of intoxications and infections. At the time of the regression of the corpus the lipoids disappear into the lymphatic vessels. In the corpus luteum at maturation and in regression cholesterin seems to be concentrated so as to pass out by internal secretion at the time of the temporary atrophy of the gland. The author has experimented *in vitro* on the neutralizing effect of lipoids on the extracts of the ovary that are soluble in water. From these experi-

ments it results that the granulations of the lipoids of the ovarian cells play an important rôle in the function of these cells. He has experimented as to the relation between this function and the content of the blood in lipoids. He finds that a substance like cholesterolin exists in the blood during the first four days of menstruation. All the author's results tend to show that cholesterolinemia favors menstruation more than lecithinemia. All animals have specific secretions, and a genital secretion which by its excreta are eliminated at menstruation or by the male prostate. The seed in plants and the ovum in animals are the theatre toward which converge all the riches of the organism. The author questions whether the affinity of the ovule for these active substances is not the cause of the ovarian crisis. It is possible that under the influence of this cellular enrichment there are formed diastases which determine the fall of the ovum from the ovary. At the same time when the phenomena of ovulation are taking place there are produced modifications in the uterine mucosa which prepare for conception. If this does not take place menstrual hemorrhage occurs and gets rid of the reserves prepared for the first phases of development. Menstruation is not only a cellular abortion but a chemical abortion.

Treatment of Large Crural Herniæ by a Fatty Graft.—M. Chaput (*Rev. de gyn. et de chir. abd.*, vol. xxiii, part 5, 1915) treats large crural hernia by operation with the application of a fatty graft to assist in the closure of the hernial opening. If these grafts have not a connection by blood-vessels they become necrotic. Therefore the author is particular to so arrange his graft that there is a good vascular connection with the skin of the original site of the graft. He gives his technic of operation carefully worked out. With this technic he has excellent results. The graft is rectangular with a base corresponding with the pubis and internally with the median line. It is sutured to the ligament of Gimbernat, the ligament of Cooper, and the crural arch. Its summit is fixed by the crural vein.

Modification of the Pulse and Arterial Tension during the Menstrual Period.—P. Balard and J. Sidaine (*Arch. mens. d'obstet. et de gyn.*, Jan., Feb., May, 1916) gives a historical sketch of the work that has been published with reference to the changes in the pulse and arterial tension during menstruation, and then follows with the results of his own personal researches. His observations were made on young, vigorous women, in full menstrual activity, in the Maternity at Bordeaux. The observations have been carried out for three months in each patient observed. The menstrual type of each subject was studied. The examinations were made at the same hour of the day, preferably in the morning. The pulse was constantly influenced by the menses. It showed a sharp elevation preceding the menses or on the first day, falling rapidly by lysis when the flow was established. The maximum arterial tension showed a slight elevation before the menses and a rapid fall toward the end of the period. The minimum was lowered four or five days before the period and slightly at the end of the menses.

Clinical Significance of Luteinic Cysts of the Ovaries.—Paul Bar (*Arch. mens. d'obstet. et de gyn.*, Jan., Feb., March, 1916) publishes a case of lutein cyst of the ovary coincident with a hydatid mole, a somewhat rare condition. The nature of the relation which unites these two orders of lesions is as yet unknown. There is no doubt that the harmonious development of the villi and decidual elements which marks the regular ovarian cycle is in relation with the modifications of the gravidic ovisac. When there is a mole, whether the deviation of the elements be primary or provoked by an abnormal decidual reaction, the fetal cellular elements no longer develop normally. They are gravely altered. All become inharmonious. The author concludes from his study of his own and the published cases that when a mole is found coincident with the presence of ovarian cysts it is prudent not to content oneself with emptying the uterus. Hysterectomy is indicated, because of the danger of the later occurrence of an invading mole. When, after evacuation of the mole, we find that the ovarian cysts continue to develop, or when we see them appear we should fear a vegetation in the uterine wall of molar elements. This significance of the ovarian cysts is more pressing when the uterine hemorrhage persists. It indicates a rapid operation with removal of the uterus.

Bleeding Nipples.—D. Lewis (*Surg., Gyn. and Obst.*, 1916, xxii, 666) has observed clinically seven cases of bleeding nipples, five of which have been operated upon. These seven cases all presented a typical serohemorrhagic discharge. The discharge in two of the cases at times became almost pure blood. In two cases the discharge was associated with chronic cystic mastitis, while in the remaining five small intracanalicular papillary cystadenomata were the cause of the hemorrhage. The character of the discharge, whether serohemorrhagic, hemorrhagic, or brownish, apparently gives no clue whether malignant changes are occurring. Some of the benign papillomatous growths have been associated with a brownish discharge. In some instances the discharge has lasted as long as nine years, in one as long as twelve. One of the cases observed by the writer showed beginning malignant changes. In this case a discharge had been noted for three months, but a tumor had been present for four. Bleeding nipples are most frequently associated with intracanalicular papillary cystadenomata and the adenocystic type of chronic mastitis. A plastic operation should be performed unless there are evidences of malignancy. The changes associated with malignant degeneration are quite definite and can be determined by gross appearance when such a cyst is opened. An operation should be advised even when there is no evidence of a tumor, for in these cases a small intracanalicular papillary cystadenoma will be found deep down in the ducts. The portion of the breast in which the growth lies can be determined by the increase of the discharge when pressure is made.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

THE TROUBLES OF THE NEW-BORN.

BY

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New York.

THE normal development of the fetus depends on the mysterious laws of heredity, the generic laws of embryology and the health of the mother. In the short transitional period between fetal and infantile life, during its passage from its uterine abode to the external world, the fetus is subjected to the vicissitudes of the obstetrical art. On its arrival into the new world, the new-born may come unscathed and in perfect health or it may be weak, feeble and below par. It may bring with it congenital diseases and malformations or obstetrical diseases and injuries. In order to exist, the infant must adopt itself to the new surroundings and the new conditions of life. Many infants pass through the early weeks of life, as well as the entire period of babyhood and enter the stage of childhood without falling a prey to disease. Some infants, however, acquire a group of diseases which for a lack of a better name have been called diseases of the new-born. The result is that the newly born may have:

1. Congenital diseases and malformations.
2. Obstetrical diseases and injuries.
3. Diseases of the new-born.

The most important congenital disease is syphilis. Occasionally tuberculosis and other infectious diseases have been transmitted from mother to child. Various constitutional diseases and tendencies including functional nervous diseases and psychic disorders have been conveyed from parents to offspring. The diagnosis of congenital syphilis is in the majority of cases not difficult, though the symptoms and signs may not be fully developed during early

infancy and the history may be negative or indefinite. A syphilitic infant looks syphilitic. A great deal depends on the severity of the infection, but the well-developed case is difficult to mistake. The Wassermann test of the blood or the cerebrospinal fluid confirms the diagnosis. The prognosis is worse in proportion to the severity of the disease, the more pronounced the symptoms and the younger the child. The treatment must be both general and specific. Proper feeding, fresh air, good care together with mercury and salvarsan or neosalvarsan are essential to the successful treatment of this destructive disease. Congenital malformations may affect any structure or organ of the body and may be within the reparative skill of the surgeon or beyond his reach.

Obstetrical diseases of the new-born as a result of infection during birth are not common and the treatment depends on the condition and the character of the infection. Injuries to the meninges, the central and peripheral nervous system, are of the greatest importance in the future life history of the infant. Traumatism to the soft parts and fractures of the bones are not infrequent during delivery. Some of the obstetrical injuries are amenable to treatment while others are impossible of repair.

The so-called diseases of the new-born are difficult of diagnosis and treatment because they differ in their etiology, pathology and symptomatology from diseases in later life. During infancy the structure and functions of the body are in an unstable and immature state. The reactions of the body to disease are irregular, incoördinate and are either in excess of the pathologic process or inadequate in response. The infant cannot help the physician to arrive at a correct diagnosis by his subjective feelings of pain and discomfort and diagnostic conclusions must be drawn from the objective symptoms and signs only. The temperature, pulse and respiration in infancy are not always a reliable guide to the severity of disease because the nerve centers are, at this time of life, in an imperfect and unstable condition and are susceptible to changes from slight internal and external influences. The pulse and respiration may also be irregular in perfectly healthy infants.

The following are some of the most important diseases of the new-born:

Asphyxia.—Asphyxia neonatorum is a condition where the respiratory system of the new-born cannot adopt itself to the new conditions of life. Since the causes of asphyxia in the newly born are more antepartum or intrapartum than postpartum, it belongs to the group of obstetrical diseases.

Atelectasis.—Though commonly known as congenital atelectasis, it is really not a congenital disease. It is simply a condition where the infants bronchopulmonary apparatus is not fully inflated and is in a more or less collapsed fetal state. The infant is air-hungry and is usually feeble and cyanotic and the pulse and respiration are poor and irregular. The physical signs vary according to the extent of the airless lung and the distance from the surface. Dulness is frequently found in the bases of the lungs posteriorly.

Pneumonia.—In the new-born pneumonia is frequently difficult of diagnosis because the response of the body by the known symptoms and physical signs to the pneumonic process is atypical and irregular. It should always be distinguished from atelectasis, because some of the symptoms and signs are alike in both conditions, and fever when present may be due to some other cause than an infection of the lungs. Careful observation, and the usual high temperature, the rapid pulse and respiration in pneumonia will aid in the diagnosis.

Gastrointestinal Disturbances.—The entire digestive system in early infancy may be weak and feeble, and unless the food is made to fit the digestive ability of the new-born, trouble is sure to follow. At birth, the digestive tract is sterile but soon becomes germ-laden and when the food is not properly digested it may give rise to putrefaction and toxemia. The meconium may become infected. A great many new-born infants are unnecessarily starved because of the lack of breast milk or its late appearance or the improper artificial feeding. An undue loss in weight during the early days of life will make the future struggle for existence more difficult.

Acute Pyogenic Infections.—A local infection in the newly born may spread and give rise to a septicemia or a septicopyemia because the vitality and the resistance is much lower in early infancy than in later life. Omphalitis is not an infrequent affection in the new-born and may not show any external signs of umbilical infection. The disease may affect the deeper layers and may cause general peritonitis with all kinds of complications and sequelæ. Ophthalmia neonatorum though a local infection is very destructive.

Icterus.—Icterus neonatorum is quite frequent and because of its frequency and harmlessness it is considered a physiologic process and as a part of the normal evolution in the life of the infant. Whether this so-called physiologic jaundice is really physiologic or pathologic, it should be carefully distinguished from the less frequent but harmful icterus due to septic infection, syphilitic hepatitis, malformations of the bile ducts and chronic family jaundice.

Hemorrhages.—Hemorrhages in the new-born form an interesting

but distressing group of diseases. The usual causes are various forms of traumatism, septic infections, syphilis and the so-called spontaneous or idiopathic hemorrhages which are probably due to an unknown infection and may occur in any organ or tissue of the body. In no disease is an early diagnosis so essential as in the hemorrhages of the new-born. If bleeding begins within the first two or three days of life it is usually of spontaneous origin and blood transfusion should be done immediately. Hemorrhages due to sepsis, syphilis or traumatism may be diagnosed by the history and the various signs and symptoms.

Obscure Fevers.—Fever of apparently unknown cause is not uncommon in the early days of life. The new-born may have a high temperature without any other evidence of disease. But a careful examination may reveal a hidden focus of infection or a pneumonia without pneumonic signs. Starvation is a frequent cause of fever. The application of hot-water bags to keep the baby warm may cause a sudden rise in temperature. The termogenic, termo-inhibitory and vasomotor centers are in an unstable and unbalanced condition during early infancy and many internal or external influences may upset the normal process of heat production, heat inhibition and radiation.

Crying.—Infants in the early weeks of life frequently suffer from colic and cry incessantly but because of its frequency and the failure of the physician in the majority of cases to relieve this distressing condition, it is looked upon by the laity as a normal event in the life of the infant. A careful study will show that the infant cries because of overfeeding or underfeeding or indigestion of the food. A correction of the dietary error will keep the infant quiet and happy.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS

Stated Meeting Held April 13, 1916.

DR. ROYAL STORRS HAYNES *in the Chair.*

MENINGOCOCCUS MENINGITIS WITH UNUSUAL HEMORRHAGIC MANIFESTATIONS.

DR. C. T. SHARPE reported this case. The child exhibited the usual symptoms of meningococcus meningitis in an unusually severe form, with, in addition, hemorrhagic areas in various locations over the body. Meningococci were demonstrated in these skin lesions. Dr. Sharpe showed lantern slides of these lesions and said that so far as he could learn this was the first instance in which this organism had been isolated from a skin lesion.

DISCUSSION.

DR. HENRY HEIMAN.—This case is extremely interesting and I have never seen anything just like it, never one so severe. If it had occurred during an epidemic one would say that it was a fulminating case, one of those severe cases that die within twelve to twenty-four hours. If there had been a number of other similar cases one might say they were due to a particularly virulent strain of meningococcus, but there was only this one case and so it seemed that it could only be explained on the theory that there was a very low degree of resistance in this individual. The disease is of a type in which the blood culture is positive, and I do not believe that the injection of serum into the blood would have been effective.

THE DEFICIENCIES IN THE STATE LAW REGULATING OVERCROWDING IN INSTITUTIONS FOR INFANTS AND CHILDREN.

DR. THOMAS S. SOUTHWORTH opened the discussion: It is admitted on all sides that the mortality among young infants placed in institutions is much greater than it should be, and greater than if the infants remained at home. This question has caused serious concern, but no very definite suggestions for relief had been forthcoming, save that all such infants should be boarded out. But

while boarding out shows results much better than those of the poorest institutions, the results do not notably exceed those of the best institutions. Even if it were desirable, institutions could not be done away with at once. The problem of the institution, therefore, is and must remain a matter of daily and hourly concern, and demands our immediate attention. Superficial changes in the institutional management of infants, while cumulative for better conditions, do not go sufficiently to the root of the matter to be immediately effective. Are there not then some fundamental factors which are now definitely contributory to the mortality, but which can be remedied? Such a factor, in Dr. Southworth's opinion, was the overcrowding in the wards, permitted and endorsed by our present inadequate and loosely drawn State law which, for lack of anything better, is applied to children of very divergent ages, conditions and needs, and is largely robbed of whatever value it might possess by the "joker" clause with which it ends. Chapter XLV of the Consolidated Laws defines their application as follows: "To every institution in this State, incorporated for the express purpose of receiving or caring for orphan, vagrant or destitute children, or juvenile delinquents, except hospitals." The law goes on to say: "The beds in every dormitory in such institution shall be separated by a passage way of not less than two feet in width, and so arranged that under each the air shall freely circulate, and there shall be adequate ventilation of each bed, and each dormitory shall be furnished with such means of ventilation as the local Board of Health shall prescribe. In every dormitory 600 cubic feet of air space shall be provided and allowed for each bed or occupant, and no more beds or occupants shall be permitted than are thus provided for, unless free and adequate means of ventilation exists approved by the local Board of Health, and a special permit in writing therefor be granted by such Board." Certainly the terms orphan, vagrant, and destitute children, or juvenile delinquent suggest children of the run-about age of two years or over, and not young infants. This view is confirmed by the use throughout of the term "dormitory" which the Century Dictionary defines as "The part of a boarding school or other institution where the inmates sleep." The inference is that the law was framed to regulate the sleeping quarters of asylums or reformatory institutions for older children who might be reasonably supposed to spend a considerable part of their time in other quarters during the day. There is no trace of implication that it was intended to be applied to infants or to wards in which more or less sick infants lived practically all the time, both day and night, during a very considerable part of the year. It would appear that it was the intention of the framers that there should be not less than 600 cubic feet per inmate; else why state it so clearly? But this intention was nullified by the final or "joker" clause, which was perhaps appended as a compromise. The "joker" or amendment grants to any local Board of Health in the State the power to issue permits for any larger number of inmates, when conse-

quent reduction in the cubic space per inmate provided for "free and adequate means of ventilation." Such adequate means of ventilation should exist. What then is the practical working of the law in New York City? Framed permits are hung upon the walls of each ward stating the number of infants allowed therein. Permits were until recently granted by the Board of Health based upon the number of square feet of floor space, allowing about fifty square feet, or slightly over, for each inmate of the ward. This has recently been changed to cubic feet, allowing about 500 cubic feet per inmate, and affording at times less than 50 square feet of floor space in certain of the institutions, depending upon the height of the ceilings. He said he had been informed authoritatively that this amount may and is reduced legally as low as 200 cubic feet per inmate in certain other types of institutions covered by the law, and that there is nothing to prevent a further reduction below 500 cubic feet in wards for infants. Whether the 600 cubic feet of space per inmate, which was the evident of the law, or any reduction therefrom, is or is not adequate for the dormitories or sleeping quarters of older and presumably well children in reformatories or orphan asylums, he was not here to discuss, but he did with all earnestness contend that the application of the law, for a lack of a better, to wards containing infants under two years of age, and especially bottle fed infants under one year of age, with an allowance of only 500 cubic feet and perhaps less than fifty square feet of floor space per infant, tends directly to increase both the morbidity and consequent mortality among such infants, a mortality which, in part at least, is preventable. The origin and authority for the 600 cubic feet standard, now largely departed from in the wrong direction, appears to be lost in obscurity; but judging from the answers received to a questionnaire sent to the members of the American Pediatric Society, compiled and published in the *Archives of Pediatrics*, September, 1915, such space allowance falls far short of the 1000 cubic feet demanded by the majority of pediatric opinion throughout the United States. In all except possibly the most modern and enlightened institutions, bottle fed infants who remain for any considerable time do not continue to be well fed infants, even though they are admitted as such. They suffer not only from digestive and nutritional disorders but from the acute infections which spread readily in overcrowding wards. Owing to the special care which such infants require, not alone when reasonably well but more particularly when sick, the wards in which they are cared for demand the larger nursing staff and adequate cubic space of sick wards. In whatever type of institution they are situated, they are to all intents and purposes hospital wards, not dormitories. Very few institutions receiving and retaining infants make adequate provision of competent nurses, or increase the number of nurses as the population of a ward increases. Overcrowding means, therefore, a proportionately decreased care of the individual infant and no one will deny that undercare makes for an increased mortality. Where permits have been issued for

an excessive number of infants, but the ward is sparsely filled, the effect of painstaking individualization in the bottle feeding may be to inaugurate satisfactory gains in the weight; but if with such care few or no infants die, continued admissions to the ward soon increase the numbers to the legalized point of overcrowding. Then, with exactly the same methods of feeding, infants who were previously doing well, cease to gain; some lose rapidly; and there are a number of deaths until the census of the infants is again reduced. In short, modern feeding methods fail, or avail only temporarily, to prolong the lives of the infants where overcrowding is permitted. With our present knowledge, it is scarcely necessary to argue that infections, both of the more subtle respiratory types and of the openly contagious types, are more readily spread by permitting closer proximity of the infant's cribs. Any one who has observed the effects upon nutrition of the invasion of the infant's ward by the usual grippal infection will need no argument concerning its resultant mortality. The question may readily be asked: "Why, if this overcrowding so manifestly contributes to the mortality, are not steps taken by the physicians of each institution to reduce the numbers in the wards?" The answer to this is that it is obviously difficult to convince lay managers that the permits issued by recognized authorities concerned with the enforcement of health regulations do not represent the last word in the most enlightened pediatric opinion concerning the needs of the infants. Thus, a law framed with beneficent intent offers not assistance but an obstacle to efforts to reduce the mortality among these infants. In the application of this law to infants, the recent trend has not been to insist upon more space than the minimum prescribed by the law, but on the contrary, to allow less space than that contemplated and specified in the law. Those whose only experience has been with infants placed for temporary treatment in the wards of well appointed hospitals, having 1000 or more cubic feet of space for each inmate, can form no adequate conception of the problems which present themselves in overcrowding institutions. The basic criteria are not the same, but the better results shown by the former, with their large space, constitute a very potent and cogent argument for the limitation of overcrowding in institutions for infants. We have been asked by the Committee of the Academy of Medicine to review this matter as a Section and from the pediatric standpoint. He suggested that the State law should be revised; that certain sections should be framed for orphan asylums, reformatories, and older children; and separate new sections framed for young children and infants; that provision should be made for ample space in sick wards; that wards containing bottle fed infants under eighteen months of age should be specifically classed as sick or hospital wards; that the amount of cubic space allowed to each of these main groups should be based upon modern pediatric opinion; and that there should be no qualifying clauses permitting the purport of the law to be nullified to suit individual caprice; that after basic space, which is sufficient with the windows closed, had been

specified, further provision may then be made for inspections and enforcement by local authorities, with a view to assuring reasonable employment of the usual available means of ventilation. Dr. Southworth did not claim that additional space was a cure-all which would remedy all the difficulties in rearing infants in institutions, but he maintained that increasing the cubic space requirement was the surest, most direct, and most feasible way of correcting a number of the evils of institutional life. So long as the present inadequate law remains on our statute books, just so long will a unnecessarily large mortality inevitably obtain in our institutions for infants, and especially among those infants under one year of age who are artificially fed.

DR. CHARLES GILMORE KERLEY.—The mortality of young children depends on so many other factors in addition to that of cubic air space that I feel this is, comparatively speaking, but a small part of the subject. If the air is undergoing active ventilation, a small cubic air space may answer very well. The peculiar feature which we meet with in most institutions is that there is but one room for a group of children and here they must stay all the while; in this one room they must play, eat and sleep, and this is the factor that does not obtain in ordinary dwellings. I believe that this is one of the worst factors in connection with institutions for infants and young children.

Another matter is with reference to an adequate system of ventilation. While I will not discuss the various systems of ventilation that we have, I will say that I do not know of a system that really does ventilate; when one wants ventilation he still has to resort to the open window. So while we realize that cubic air space is important, it is rather insignificant if other factors are not taken into consideration.

DR. HENRY DWIGHT CHAPIN.—Dr. Kerley has brought out the two points that I would emphasize. We may have one thousand or ten thousand cubic feet of air space and if everything is shut up the supply of air may be insufficient; the essential factor is to have an adequate supply of freely moving fresh air and then the cubic air space is not so important. Last summer I visited one institution in Portland, Oregon, where they were having a very low mortality and yet everything in connection with the air space and ventilation was wrong. There was, however, a wide piazza and the children were out in the fresh air all day and this was probably a factor in the low mortality under what were otherwise very bad conditions. It seems to me that the best way of dealing with institutions for infants is to abolish them as far as possible. It has been said that lay boards make the rules and doctors follow them. The doctors should say that if conditions were not improved, they would no longer remain on the staffs of such institutions. We may as well recognize the fact that the trouble lies in a lack of proper force on the part of the doctor.

DR. FLOYD M. CRANDALL.—This question has been brought before you for very definite reasons, particularly for opinions

with reference to accommodations for infants and children in institutions as measured by cubic air space. It was with this object in view that this question has been referred to this section for an expression of opinion. That is what the discussion should bring out. The question has come up whether the Public Health Committee of the Academy of Medicine should take up the modifying of this law. The question should be considered by pediatricians first and the doctors who discuss it should bring out something definite and tangible. It is an inadequate law in that it lodges the decision in the matter of overcrowding in the hands of the managers of institutions and so long as they are protected by the law, as they now are, they are not liable to be more liberal than the law requires.

It was decided that the best way to get the desired information in reference to cubic air space was to appoint a committee to send a questionnaire to the members of the Section and to submit the result to the Council of Public Health of the Academy.

THE HOSPITAL CONTROL OF THE INFECTIOUS DISEASES OF INFANCY AND CHILDHOOD.

DR. DENNETT L. RICHARDSON, Superintendent of the Providence City Hospital, read this paper by invitation. He said that present day investigations of infectious diseases were most interesting and valuable and that this was a promising field of endeavor which would yield new truths, the scientific application of which would greatly diminish human suffering and loss of life. These studies should embrace statistical data, accurate clinical observation, and clinical research. The problems to be solved are the etiology, the determination of the secretions and excretions in which the virus exists, the earliest and latest periods of infectivity, the fate of the virus after it leaves the body, the natural modes of transmission, the atrium of infection, and the exact and early means of diagnosis, and finally the treatment. This paper presents some facts on the transmission of contagious diseases learned by hospital observations. It is pretty well established that the sources of any infectious diseases are three; the clinical case, the missed case and the carrier. The disputed questions relate to the methods by which the virus finds its way into the healthy person. Formerly the rôle of air infection was given more attention than the avoidance of infection by contact, but through the observations of certain French investigators, the conclusion has been reached that the diseases in question are seldom air borne and that isolation of the patient is not complete unless rigid antisepsis is carried out. The practical results obtained at the Pasteur and several other French hospitals have shown that with the employment of aseptic nursing it is no longer necessary to house different diseases in separate pavilions. In consequence of this there have developed several methods of construction by which one may obtain physical separation of patients suffering from different infectious diseases and

yet treat them in the same ward. These systems are: 1. The cubicle system, having its origin in the Pasteur Hospital and consisting of single rooms, the partitions being complete or only partially reaching to the ceiling and arranged on both sides of a common corridor. 2. The barrier system, consisting of bed isolation of different diseases in a large open ward, the beds being placed about 12 feet apart on centers. These isolated beds are designated by colored tape stretched between two uprights at the foot of the bed or by the use of printed colored cards. A few hospitals separate patients in a large ward by low glass partitions between the beds as at the Willard Parker and Johns Hopkins. 3. The cellular block plan as constructed at the Plaistow Hospital consists of two rows of rooms back to back with glass partitions between them, each room leading to an open veranda on either side of the building. The statistical records of London hospitals into which these systems were introduced demonstrated the success of aseptic nursing, though they showed that measles and chickenpox were the most difficult to care for by aseptic nursing.

In March, 1910, aseptic nursing was first undertaken at the Providence City Hospital, which had been constructed in accordance with the theories of medical asepsis through the efforts of Dr. Charles V. Chapin, Superintendent of Health of Providence. Patients suffering from infectious diseases are accommodated in three two-story pavilions, arranged parallel, and containing about 140 beds. Two of the buildings are duplicates; each floor of these pavilions is so arranged that about half the patients can be placed in rooms off the central corridor and containing from one to three beds each, while there is a convalescent ward with fourteen beds at the south end of the building. At the present time one of the duplicate buildings is devoted to scarlet fever. The first floor of the other building houses the diphtheria patients; the second floor is used for an isolation ward where various infectious diseases except measles and chickenpox are treated. These highly transmissible diseases are not included because the nursing in these buildings is largely done by pupil nurses who have had only two months training in technic. The third building, the so-called isolation building, provides for the care of any infectious disease, including smallpox. Every room is provided with a lavatory where the water must be turned on by forearm or foot levers and where nurses and physicians must wash contaminated hands in running water with soap and scrub brush. Immersion in an antiseptic solution is also required after such diseases as measles, chickenpox and smallpox, and very septic cases of other infectious diseases.

Elaborate construction alone is quite unable to prevent cross-infection. Proper management is of far greater importance. The latter resolves itself into proper admission of patients to prevent mistakes of diagnosis, securing a history of other infectious diseases in the home, active and intelligent observation of patients for symptoms of secondary disease; careful attention to the health of all employees; absolute separation of patients suffering from different

diseases, and the proper and efficient sterilization of hands, utensils, and linen between different infectious units. At the time of admission all doubtful cases are isolated until the diagnosis is clear. Nurses must be impressed with the importance of asepsis and taught the details of its administration. They are taught that the room occupied by a patient is an infected area and under no condition shall she touch, or allow her clothing to touch, anything in such a room unless she has her gown on. Everything taken from such a room must be properly sterilized. The nurse herself must scrub her hands thoroughly for at least 3 minutes on leaving. She must see that patients in different units never come into direct or indirect contact. When a patient is ready for discharge he is given a soap and water bath and shampoo. This bath is given the day before discharge, and the patient is then put into a clean room set aside in each ward as a discharging room. When the mother comes for the child clean clothes are put on him and if he presents no symptoms after careful examination he is taken away. The rooms have never been fumigated since the opening of the hospital, but the floors and furniture, and in the isolation wards the walls within easy reach, are washed with soap and water. A careful record has been kept of the room or rooms occupied by each patient, and have never been able to trace any cross-infection to this source. Infected linen is collected under aseptic precautions and placed directly into washers where it is washed by boiling water and its sterility tested by cultural experiment. No sterilizing washers are used.

All the elaborate technic of caring for the patient must be supplemented by careful supervision of the nurses, lest a sick nurse be on duty. The same supervision applies to all the hospital personnel. Resident physicians wear white suits. Over their shirts they wear a short-sleeved washable vest, outside of which is worn the usual white coat. When visiting patients the coat is removed and a gown is worn only when making careful physical examinations. The doctor always scrubs his hands in going from one infectious disease to another.

From March 1, 1910 to Jan. 1, 1916, 6748 patients have been discharged from the hospital and among these there occurred 166 cross-infections. The diseases contracted were as follows: Measles, 48; chicken-pox, 78; scarlet fever, 19; diphtheria, 10; rubella, 4; whooping cough, 4; mumps, 3. The total incidence for the whole hospital was 2.4 per cent. If from the total number of discharges, 2029 adult patients suffering from tuberculosis and syphilis were subtracted leaving 4689, nearly all of whom were children, the incidence is 3.5 per cent. There has never been a cross-infection among the tuberculous and syphilitic patients. In the isolation wards where a great variety of infectious diseases were treated, 2788 patients were treated and 92 cross-infections developed, an incidence of 3.3 per cent., slightly less than for the whole hospital, exclusive of tuberculous and syphilitic patients.

Nearly all instances of infectious diseases arising among em-

ployees have occurred among pupil nurses. It was interesting to note that nine nurses were diphtheria carriers when they entered upon their duties while only nine were found to be carriers when they had finished their course. Of 424 nurses, sixty-four had previously had diphtheria, and nineteen pupils and one graduate contracted the disease. One hundred and twenty-one had previously had scarlet fever and nineteen pupils and one graduate contracted the disease; 335 had previously had measles and none contracted it; fifty had previously had rubella and two pupils and two graduates developed the disease; 184 had had mumps and only two contracted this disease. Among 229 employees during the same period only five contracted an infectious disease.

These results demonstrate that rigid asepsis is of primary importance. Hospitals for infectious diseases and for children should not have wards of over six to ten beds each and should have sufficient smaller units to accommodate all patients for an observation period. Conservative and accurate diagnosis on the admission of patients and careful supervision will prevent the entrance or continued residence in the same unit of patients suffering from more than one transmissible infectious disease. Among forty-two house officers serving during this period two have developed diphtheria and one both mumps and rubella.

DR. GEORGE DRAPER.—A most notable feature is that among the great array of infectious diseases considered in the paper, no mention is made of poliomyelitis. Why were there so few cases of poliomyelitis at this great institution? Two reasons may account for this fact. First poliomyelitis has essentially a rural distribution, and secondly sporadic cases, in the city, come usually into the large general hospital.

The care of poliomyelitis in a hospital such as Dr. Richardson has described is a simple problem. The management of this disease is essentially the same as that of diphtheria or scarlet fever. Perhaps particular stress should be laid upon caring for secretæ and excretæ.

There have been a number of instances of cross infection recorded during epidemics in Sweden. Among nurses a number of cases have been reported both in Europe and America. Their protection as far as we know rests upon rigid care of the hands, nasal passages and the mouth.

One cannot say much more of the control of the disease in hospitals, since the control must be similar to that of other diseases; possibly in addition there should be special care of the nose and throat of contacts. The attendants should use a spray of peroxide solution, or menthol in oil.

With regard to the general control of the disease in the community, quarantine at present is our best defence. While most of the means of transmission have been determined, some apparently still remain hidden. It has not yet been determined why one infant in a family contracts the disease and not others in the same family; why some sections of a community have a number of cases

and others not; and why at another time it will be found in that section of the community which before was free. The part played by mild abortive cases and healthy carriers must still be thoroughly cleared up. Contacts must be thoroughly controlled and likewise the carriers and the patients, and the same rigid quarantine must be maintained as in other infectious diseases, though it has not been definitely demonstrated that the virus found in the nose and throats of healthy carriers transmits the disease. The duration of activity of the virus in convalescent patients is important. A case has been reported of a child having two attacks of the disease two years apart, and five months after the second attack it still harbored the virus. In monkeys the virus usually disappears from the mucous membranes in five or six weeks but in certain individual monkeys it may persist for four or five months. The incubation period normally is from two to seven days, but there may be a very long latent period. In the case of a young woman who was committed to prison and who developed poliomyelitis two months after her admission to solitary confinement is found the suggestion of this prolonged latent period. From these facts it would seem that we should give more consideration to the proper control of poliomyelitis.

DR. HENRY HEIMAN said: The epidemiology of meningococcus meningitis presents features at times which have been so strange and puzzling and so different from the characteristics usually associated with other contagious, or so-called readily communicable, diseases that the contagiousness has been questioned by not a few observers. As a rule there is no regular progression or extension of the disease. It moves by leaps and bounds and seems to strike at haphazard. In those dwellings in which there were more than one case the patients did not acquire the disease from each other, as it appeared simultaneously in the different individuals and not successively.

In considering the hospital control of infectious diseases from the standpoint of meningococcus meningitis, it is advisable to consider first the mode of transmission of the disease. It is well known that the disease is a communicable one and occurs in epidemics. It is also endemic in the city of New York, as most of the other communicable diseases are. It is generally conceded that the mode of transmission is by means of Flüge's droplet infection, that is to say, the meningococcus is transmitted to the exposed mucous membranes of previously healthy persons. Meningitis may or may not be the result of this transmission, depending entirely upon the susceptibility or resistance of the individual, that is to say, that they may be receptive and not susceptible to the meningococcus and harbor it there for weeks or longer. The natural history of the meningococcus makes it improbable that the disease is transmissible through the agency of the atmosphere or lifeless objects, but directly from one individual to another. This does not necessarily mean that transmission is from patient to patient, but in most cases the source of contagion is a healthy or

apparently healthy meningococcus carrier. The strange fact that cases of hospital contagion are so rare is probably due to the greater number of meningitis patients in these institutions being children. Experiments have shown that there are ten to twenty times as many healthy carriers as there are diseased carriers or patients. Therefore in order to properly control the spread of this disease, we must devote our attention to prophylactic measures. In hospitals at present the preëminent prophylactic measures are the gown, the hand brush, and disinfectants; and it would seem rational to add the usual measures, the gargle and the cleansing of the nasopharynx of the physician, nurse, or anybody coming in contact with the patient. The disinfection of all the excreta of the patients, especially those of the respiratory tract in adults (since children as a rule swallow their sputum) is of the utmost importance. Experience has shown that absolute quarantine in hospitals is not necessary, as transmission of the disease in hospitals is comparatively rare. Leichtenstern, however, reports that three nurses and a sister in attendance on cases of meningitis in the wards contracted the disease. Three of them had not left the hospital for some time, and could not have acquired the disease from the outside. In the New York Hospital Elser and Huntoon found three instances of infection of nurses in attendance on adult cases of meningitis. School infections, though rare, are reported by Bolduan and Goodwin and Netter and Debrè. The latter observed ten cases, six of which attended a common school. Among 231 pupils of this school there were found forty meningococcus carriers, that is, 21.21 per cent. Flügge finds that 70 per cent. of the individuals living in close proximity to a meningitis patient become carriers. Netter and Debrè found 41.66 per cent. carriers in the months of March and April and May in the immediate vicinity of the patient, as contrasted with 26.66 per cent. during June, July and August.

With our modern improved laboratory technic it would not be amiss to have occasional cultures of the nasopharynx taken from the doctors and nurses attending the cases. Overcrowding in hospitals during an epidemic of meningococcus meningitis should be avoided. We should further urge upon the public the advisability of sending meningococcus meningitis case, if possible, to the hospital for the sake of preventing the spread of the disease, as well as for better observation and better control of the cases by laboratory methods. If patients remain at home, they should be isolated and intermingling between the members of the family and the outside world restricted as much as possible.

Incidentally it may be mentioned that children belonging to the family of the patient should not be permitted to attend school for about three weeks from the onset of the disease, unless they may be proved by bacteriological methods to be noncarriers.

In conclusion I wish to emphasize the importance of the healthy carriers in the transmission of meningococcus meningitis and that our attention should be directed almost as much to these persons as to the patients themselves. It is not possible to detect

or control all these healthy carriers, but prophylactic measures along these lines would probably help to lessen the dissemination of the disease.

DR. WILLIAM H. PARK spoke on the hospital control of diphtheria: In the first place it has been interesting to observe how we have received a paper like Dr. Richardson's. Five or ten years ago we would have thought that such a method was not effective quarantine. We would have thought that caring for two kinds of infectious diseases with only a partition open at the top between them would not prevent transmission.

As to diphtheria and the Schick test, I believe that we can rely absolutely on a negative Schick test as evidence that an individual is immune to diphtheria, except in young children where one cannot rely upon the test. For instance, Dr. Hess had one baby which gave a negative Schick test and three months afterward developed diphtheria. In early infancy the child still has its mother's immunity, which it loses later, and this would explain the occurrence of diphtheria in an infant after it has shown a negative reaction. However, it is different with adults and in them a negative Schick reaction may be entirely depended upon. We had one physician who had a slight patch on his throat and some constitutional symptoms of diphtheria and an attack of heart failure; it was thought that he had diphtheria, but three Schick tests were negative and he simply had the same kind of a collapse which others have had with an attack of grippe.

We have had our views as to the value of active immunization changed; we find that about 90 per cent. of those who are given immunizing doses of the toxin-antitoxin do not develop antitoxin for some weeks, so that in hospitals the production of active immunity is only of practical value for physicians and nurses, but for the protection of patients we must still rely upon passive immunity.

Up to the present time nothing has been discovered that is effective in the treatment of diphtheria carriers. It has been shown that a careful antiseptic toilet of the nose and throat simply covers up the bacilli and after a few days without treatment they show themselves again. The only measure that seems to be effective is the removal of the tonsils.

The production of active immunity to diphtheria has a wide field of usefulness. We have already conferred active immunity on 10,000 children in institutions and hope soon to take up the health centers, and try to protect as many children as possible.

I would like to ask Dr. Richardson if he would separate all the different contagious diseases if he had the facilities rather than put them in the same ward where it is necessary to carry out this rigid asepsis.

DR. BERTRAM H. WATERS.—It is rather difficult to discuss the subject of whooping cough in relation to hospital control since so few cases of whooping cough are sent to the hospital. It is estimated that only about 50 per cent. of the cases of whooping cough are reported and only a very few of these come under the control of the

hospital. Whooping cough presents a rather difficult problem as we are all aware, and the Department of Health does not supervise whooping cough cases because of the difficulty of obtaining early reports and since the period of greatest infectivity of the disease is that before a diagnosis can be made and also because of lack of funds and men to carry out such work, these being all needed to look after the more severe forms of contagious disease. A question that is being considered at the present time is whether it would not be advisable to require a two weeks quarantine for whooping cough that would cover the first week and aid in controlling the infection during the second week. Such a plan would require at least one visit by a representative of the Health Department.

I feel that we have had very promising results in immunity from the use of the vaccine as shown by the very interesting work of Dr. Park and Dr. Hess.

DR. ALFRED F. HESS, in discussing the hospital control of measles, said: The hospital control of measles is particularly interesting because the mortality of measles in hospitals is so different from the mortality in the homes. In the community the mortality from measles is rather low, while in Willard Parker Hospital there is a mortality from this disease of 15 to 20 per cent. A statement like this may strike you as a rather severe arraignment of the hospital, but further investigation has shown that the hospital is not so much to blame for this high mortality. We find that about one-third of the hospital cases of measles are under two years of age. In the last three months of 319 cases, 112 were under two years of age, which falls far below the age incidence in the community. Again the mortality from measles is almost entirely due to pneumonia. During March there were twenty-five deaths due to pneumonia; twenty-one of these cases of pneumonia were admitted to the hospital with the disease and four developed it in the institution. In February there were seventeen cases of pneumonia admitted and two developed the disease after admission to the hospital. The high mortality from measles and pneumonia in contagious disease hospitals is largely due to the fact that they receive the very severe cases which are transferred from homes and institutions. Out of fifty-six children that died twenty-one came not from homes but from other institutions. It is, however, a recognized fact that we have a higher mortality from measles in orphan asylums and foundling homes than in private homes.

There is no specific treatment for measles and pneumonia. It seems to me that such being the case it is advisable to direct our treatment to the pneumonia and give the patient the treatment for this disease. We have always been afraid of fresh air for cases of measles and have shut these patients up, but when measles is complicated with pneumonia it will be well to make an exception and give the patient the benefit of fresh air. Furthermore we ought not, unless it is absolutely necessary, have cases of measles under two years of age sent to the hospital, but should keep these infants under two years of age at home. In a recent investigation

of the cases coming to Willard Parker Hospital we found that medical inspectors had been sending these cases to the hospital. We had one instance of a child that developed measles in an institution and instead of sending for the mother of the child and having her take the child home, he was sent to the hospital. A mother would be willing to care for such a child, especially would she be willing if she was told that children with measles did better at home than in a hospital. If the community were instructed in this way in regard to the mortality from measles in the contagious and other hospitals we could get their coöperation in keeping these young children out of the hospitals and thus lessen the mortality from this disease.

DR. HAVEN EMERSON.—New York as well as the rest of the country is indebted to our teachers from Providence and it is a pleasure to have this opportunity to pay our respects to Dr. Richardson. The fact that we have abandoned fumigation may be attributed to the teachings of Dr. Chapin. In building our new hospitals, the new Queensboro Hospital, the new pavilions of Riverside Hospital and the new measles building at Willard Parker, we have practically followed out their plans of construction with very slight modifications; that is we have a common balcony at the end of the wards, or rows of cubicles.

When it comes to confining infection to the individual we must establish the same teaching among medical nurses that we have been emphasizing in the training of surgical nurses, that is, they must be taught aseptic technic. If this is possible there is no reason why these diseases cannot be treated in a department of a general hospital. It costs a great deal to keep up a 900 bed plant simply on the possibility that they may be needed at certain seasons and it would be a great economy if we could use these beds all the year around for other than the acute infectious diseases of childhood. This could be done by absorbing the contagious cases during the season when they are most prevalent, even if chronic cases, such as those of tuberculosis and syphilis, were not admitted during the height of epidemics of scarlet fever or measles, and then accepted when the other infectious diseases were less prevalent. We are all acquainted with the high mortality from measles in institutions and hospitals. I would like to have physicians teach the people to keep these children at home. It is a question whether children under two with measles ought to be admitted under any conditions, certainly only when the home conditions are such that it is absolutely impossible to give them the first elements of decent care. There will always be a need, however, for some hospital that will care for measles in New York City.

There is also the question of the advisability whether we make every effort to admit cases of whooping cough when the case occurs in a family in which there is a child under two years of age who will be exposed to the infection. It seems, too, that we ought properly to take in favus, for a number of children lose a large part of their school life on account of this disease. I also feel that ringworm

could be received and treated in hospitals with advantage and with a saving of many years time for the child that is now kept out of school or kept in an institution.

It is certain that the hospital care of diphtheria and scarlet fever is better than the home care and the results are more encouraging than those obtained in the hospital care of measles.

By the application of the principles we have heard described to-night the Department of Health might keep its hospitals full twelve and not only for three months out of the year and this would reduce the cost and add much needed facilities for some of the neglected infections.

DR. DENNETT L. RICHARDSON, of Providence, in closing the discussion, said: In reply to Dr. Park I may say that I think our work has been more or less misunderstood. We have a ward for scarlet fever and one for diphtheria in which we have introduced other diseases occasionally, and three isolation wards for various infectious diseases. The plan of admissions we carry out is a process of filtration keeping all new patients in small units for one week's period of observation. Our plan means more to the small town or the small city that cannot afford to have a hospital for each infectious disease, one for scarlet fever, another for diphtheria, etc. In a small city where there is a necessity for economy this plan can be carried out if one knows the underlying principle. This is that contact infection, infected human beings, and not environment is the source of infection, and if we can control the contacts, the mild cases, and the clinical cases we can have much better control of infectious diseases.

DR. HAYNES.—How do your statistics with reference to cross-infections compare with those of other hospitals?

DR. RICHARDSON.—Few American hospitals have published reports on that point. The only one I know of is Dr. Aucker of the St. Paul County Hospital. He gives the number of cross infections and the number of cases of infectious disease among employees and nurses. This is the only report beside that of the Providence City Hospital in this country that gives this data but some of the foreign reports show that for scarlet fever and diphtheria the number of cross-infections have been as high as 7 per cent.

DR. KERLEY.—I would like to ask if you have had any experience with reference to the incubation period of scarlet fever.

DR. RICHARDSON.—The shortest incubation period that I have known was thirty-six hours and as to the other limit I do not think any one knows. If a child comes into the hospital with scarlet fever, and if at the end of four weeks it is necessary to detain him for a day or two and then another child comes in from the same family we cannot say whether he was infected by the other child at home, a mild case that has escaped detection, or whether the incubation period has been long, the patient having been infected by the hospital patient admitted four weeks before. Had the hospital case returned home at the time intended the second case would be looked upon as a return case.

TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK.

One Hundred and Tenth Annual Meeting,

Held at Saratoga Springs, May 16, 17, and 18, 1916.

SECTION ON PEDIATRICS.

DR. JOHN L. HEFFRON, *Chairman of the Section on Medicine,
in the Chair.*

This was a joint meeting of the Sections on Pediatrics, Medicine and Public Health.

THE VISION OF THE SCHOOL CHILD.

DR. F. PARK LEWIS, Buffalo.—The extraordinary conditions which have arisen during the past year in connection with the world war have compelled us to look upon some of our social problems from a new angle. We have been forced to believe that principles upon which our republic is founded, far from being absolutely established, are still on trial, that democracy is still an experiment, and that its success is wholly dependent upon the character of those who constitute the electorate. We have been made to believe that the stream of immigrants that has poured into this country during past decades has brought with it vast numbers who have been barely able to support themselves and their numerous progeny, and many of these are of low grade physically, and that others have in their bodies the seeds of disease or of infirmities which they transmit to their offspring. The necessity which is now being so forcibly emphasized of internal preparedness requires that the child of to-day should have remedied every defect which limits his potentialities. It becomes then a matter of self-preservation on the part of the State to protect its own future by using every possible effort to make each child as capable of the higher responsibilities of citizenship as his conditions and circumstances will permit. This is happily being met with in some measure by the medical examinations in our schools. In this brief consideration of the subject, it is intended to emphasize the following propositions: First, in order that we may know how much importance to attach to defects of the eyes, we must have exact data as to their incidence, their character, their

corrigibility and their influence in retarding the normal progress of a large number of individuals. Second, in order that we may acquire these facts, standardized methods must be devised which are applicable to the entire school population. Third, measures must be considered for the analysis of the material so gathered that practical and facile methods may be employed in each case so that it receive suitable attention. In order that we may realize how inadequate are our present methods it is necessary only to refer to any of the reports of the eye examinations of large numbers of children. Careful work has been done in Pennsylvania; in the report of 1914-15, in the 4th class districts, the number of pupils inspected amounted to 469,199; among these 83,748, or 17.8 per cent., were found with visual defects. Pupils having other eye defects numbered 5512. It becomes necessary very clearly to discriminate between the various conditions that are classified in bulk as "defects of the eyes." Until such discriminations are made the records will show that vast numbers reported as having defective sight remain uncorrected and are reported as unfinished cases. In many instances this is inevitable. What disposition shall be made with such pupils in the classification and arrangement of the school? These cannot see adequately to maintain their position in the classes with those whose eyes are good; therefore, some other method must be devised by which they may be relegated to special classes or other provision made for their instruction. The teacher, with not more than fifty children in her class, has opportunities for observation which are superior to those of any outside investigator who comes temporarily into the examining room. The methods employed in the correction of eye defects are not always effective; when the work is done for a poor child, the patient is usually referred either to a public dispensary or to an optician. The refractive work done in public dispensaries is too frequently done in a hurried and careless way. If the poor child is sent to an optician the work is even more slightly done. The small amount paid for the lenses by those who are poor is often a burden. Since the State concerns itself with the welfare of the child to such a degree as to insist upon the child being examined and getting spectacles, it should go still further to see that the examinations are made under right conditions and that suitable and well fitting glasses are provided at a minimum cost. When the parents are too poor to pay for them they should be supplied by the school authorities gratuitously as books are provided for study. This cannot be done when the school child is sent anywhere, or where the examinations are made perfunctorily. Through the efforts which have been made by the State Medical Inspector of Schools, Dr. William A. Howe, a large number of careful and dependable ophthalmologists have offered their services for the gratuitous examination, at specified times and places, of such necessitous cases as may be referred to them. This is an excellent beginning. But the problem is too big to be met in this way. The importance of the municipality establishing its own clinic for refraction, and supplying the poor pupils with glasses, was emphasized in a paper

read at the Fourth International Congress on School Hygiene by Dr. Louis C. Wessels, in which he pointed out that from an economical standpoint it was a saving of money to see that the children in the public schools had such eye equipment as would enable them adequately to do the work that is required of them. Such a clinic has been established in Philadelphia. There are very few of the children who are beginning school life who know how the eyes should be used and it was suggested by a committee chosen by the National Education Association, and later by a committee of women school principals in New York City, that the child, when he begins to use books, be taught how they should be used, and the following simple recommendations be printed on the first blank page of every school book: 1. Take care of your sight; upon it depends much of your safety and success in life. 2. Always hold your head up when you read. 3. Hold your book fourteen inches from your face. 4. Be sure that the light is clear and good. 5. Never read in the twilight, in a moving car, or in a reclining position. 6. Never read with the sun shining directly on the book. 7. Never face the light in reading. 8. Let the light come from behind you or over the left shoulder. 9. Avoid books or papers printed indistinctly or in small type. 10. Rest your eyes frequently by looking away from the book. 11. Cleanse the eyes night and morning with pure water. 12. Never rub your eyes with your hands or an unclean towel, handkerchief or cloth. Another reason why permanent records should be made of all school children's eyes is found in the Workman's Compensation Act which has recently been put upon the statutes of the State. It is constantly becoming more evident that with the assumption of responsibility on the part of the employer for injuries received by the employee in the performance of his duties, that there must be an assurance of the existence of a normal physical condition on the part of the workman who is thus protected, but if there is an abnormal condition present this must be recognized and known in order that the extent of the injury may be ascertained. It must be evident that if the examination of the eyes of all the school children of the State were so standardized as to make it a part of the routine work, if these records were permanent and available, they would serve, not only as a basis for the immediate relief of difficulties limiting the child's possibilities of usefulness, but would constitute an essential feature in our preparedness program in giving us the important and necessary data concerning every individual in the State.

SOME PRACTICAL EXPERIENCES IN MEDICAL INSPECTIONS IN RURAL SECTIONS.

DR. WILLIAM A. HOWE, Albany.—During the first year of the administration of the medical inspection law, many impressive and varied experiences have arisen throughout the State. Those to which I wish to call your attention are taken from the rural sections where

many of our most difficult problems in this phase of the work are to be found. Some of you will note how highly gratifying are the results accomplished and the progressive interest indicated, while others are equally as discouraging in their serious embarrassment to the work. Many grateful parents have written the Department thanking it for the wonderful relief extended to their children. Thousands of children have been placed on a higher plane of physical fitness thus enabling them to make more normal progress in school. While most of these cases, as might be expected, belong to those commonly seen, many have been most impressive. Two children have come under our observation with congenital cataract whose vision amounted to practically nothing. They have been successfully operated, restored to vision, and placed in school where satisfactory progress is now being made. In one family three were found with so little vision as to render regular school work impossible. The two of school age have recently been placed in the New York State School for the Blind at Batavia where they will receive an academic education, taught some vocation and be made self sustaining citizens. Another child with a badly disabled foot following infantile paralysis has been successfully treated by tendon transplantation. In two instances where pupils were incorrigible, impertinent, backward and unmanageable in school, were improved promptly after the removal of septic tonsils and obstructing adenoids. Several cases of tuberculosis have been found among our teachers, while in one district this disease had existed among the pupils for nearly fourteen years. Many pupils throughout the State either in the pretuberculous or incipient stage of the disease have been recognized and greatly benefited by sanitary or institutional treatment. The fact that tuberculosis increases so rapidly among children during their first years of life in school should demand the serious consideration of not only health workers but educators as well. Our joint energies should be directed to determine the factors entering into these alarming conditions that the proper preventive measures may be speedily administered. Increasing interest is being manifested in medical inspection in the rural sections of the State. This is indicated not only in a general demand for more efficient services at the hands of the inspector but in systematic efforts to extend relief to children needing attention. A few days ago one of our village districts reported fifty cases of obstructed breathing among children of foreign parentage or from dependent families. During the next few weeks these will be referred to specialists in Rochester who have generously designated free services to deserving children. In another village in Western New York certain school rooms are being utilized as a temporary hospital where under the supervision of an experienced nurse, physicians and surgeons are administering relief to local children. Again in the town of Schenectady, seven rural schools have united in the employment of a school nurse who is devoting her entire time to inspecting the children thereof and to the improvement of school and home conditions. This nurse though only employed for only the

past three months has already accomplished such splendid results as to fully demonstrate the practical value of such services. In another section of the State we find a rural teacher referring many of her children to specialists in the city of Buffalo where embarrassing physical defects have been relieved, thus insuring to pupils far greater progress in school.

In conclusion and in view of such experiences as well as many others which might be given let us suggest: That only physicians interested or willing to take an interest in the work be utilized as medical inspectors; that the utmost care be exercised in all examinations and that definite care be shown in giving information to parents as to the defects found; that physicians should receive a fee commensurate with the services rendered, which on all occasions should be his best; that physician, teacher, parent, pupil and nurse should coöperate in the entire system of school inspection; that the real success of school inspection will be measured by the thoroughness with which the examinations are made and the results accomplished.

SUMMARY OF SCOPE OF PRACTICABLE EXAMINATION IN ROUTINE SCHOOL MEDICAL INSPECTION.

DR. CLINTON P. McCORD, Albany.—The most essential thing to determine in a given district is the size of the working staff. Any district with 3000 children should employ its school medical inspector for "full time." The working unit is one doctor and two nurses for each 3000 children. We are rather skeptical as to the realization of the "full time" ideal outside the larger cities for some little time. An examination of the character indicated in the *health certificate* referred to in the New York State law is practicable only in a physician's office and cannot be properly accomplished in less than a half hour. In most school buildings the only examining room available is the kindergarten in the afternoon or the principal's office. Under such conditions the removal of the clothing is not practicable, and besides, a competent examiner will be able to ascertain all facts required for purposes of school medical inspection without removing any clothing except in a relatively small number of cases. This last group includes the poorly nourished children; those with cervical nodes that show a tendency to break down; those with chronic coughs or digestive disturbances; those that are extremely nervous or those that suffer from dizziness and shortness of breath. There is no reason why an examination such as the one later outlined should not be accomplished in the rural school room in case a more suitable place is not available.

In considering routine examination we must consider the question of school medical inspection records. A card system should include the following: physical record card; parental notification card; miscellaneous case card; report of sanitary survey; medical inspector's report blank; school nurse's report; dental record cards; physical training card; open-air school records; and special class records.

In most places to-day the working unit is too small to give all the children adequate care. Proper standardization of working staff and scope of work should be our first thought. It is of little good to require an examination involving a chest examination when one "part time" man is appointed to 4000 or 5000 children. Where conditions are such that a "part time" man has more than a 1000 children a chest examination should not be considered except in the case of the relatively few anemic, flat chested, nervous children and those with suspicious lymph nodes; or those that bring to us evident signs and symptoms of organic heart disease. Working two hours a day, five days weekly, for thirty-six weeks an inspector may examine approximately 1000 children. Working one hour a day for the school year he will examine approximately 450 children. In the same time the more superficial type of examination (not involving routine chest examination) can be given to three times as many children; and if the nurse is trained to give the eye test then the inspector can examine four or five times as many.

Certain standards should be suggested to govern the reporting of defects. Good fundamental training in the specialties is desirable. An analysis of examinations of several thousand children by 167 different general practitioners shows a wide range in standards of judgment as to the existence of physical defects. Where school inspection is carried on by general practitioners a set of regulations should be formulated for their guidance that should embody a discussion of the procedures and standards approved by specially trained and expert school health workers.

The routine examination should cover the following:

Eyes.—The Snellen card test plus a card for near vision and astigmatic chart in some cases. These tests must be given with an appreciation of possibilities of error in handling children.

Ears.—The watch test is perhaps the most practicable. There is considerable variation in the response of children at different ages. Discharging ears are serious.

Tonsils.—Enlarged and cryptic tonsils with a history of frequent sore throat are perhaps pathologic.

Nose.—Medical inspector diagnoses nasal obstruction, leaving it to the family physician to determine the cause of the obstruction.

Teeth.—Decay of the "six year" molars is the most important thing to look for. It is poor economy to employ a dentist to inspect mouths of school children; he had better be employed in actual treatment of the most urgent cases.

Nutrition.—The judgment of nutrition is based on pinched, pallid features, arrested development, the lack of spontaneous activity, weak and flabby tissues and the signs of nervous exhaustion.

Skin and Glandular.—The enlarged cervical nodes associated with poor nutrition, those that become acutely inflamed and those that undergo softening are the ones that merit attention.

Eczemas and any contagious or parasitic skin disorder should also be looked for. Simple home treatment for pediculosis is indicated.

Orthopedic and Nervous.—Stoop shoulders and flat chest; lateral

curvature; "general nervousness;" chorea; psychic disturbances of adolescence; epilepsy; mental deficiency, etc., should be kept in mind under this heading.

Acute Contagious Diseases.—This is a very important though relatively small part of the work of school medical inspection.

The medical profession as well as the parents should awaken to the wisdom of health supervision prior to school age. "Part time" medical inspectors should be employed for at least two hours daily for the entire school year. Medical inspectors should develop school dispensaries where local clinical facilities are inadequate. School health work is more than putting glasses on children who cannot see well; removing adenoids, tonsils, and filling decayed teeth; it involves a wide understanding of the various social, educational and economic problems that are closely bound up with the physical condition of the children.

THE NEUROPATHIC CHILD.

DR. EDWARD B. ANGELL, Rochester.—Francis Warner, who examined 100,000 of the school children of London, has described the nervous child and no better description than his can be given. He calls attention to the following symptoms in this type of child: grinding the teeth; difficulty in going to sleep, they are always tired; not ready for breakfast; delicate without having actual disease; are very susceptible to disease; show a lack of appetite or capricious appetite. These children are generally well made in body, with good heads and well-cut features, fine skin and light complexion. An early indication of their nervous instability is overspontaneousness. They may show even in infancy these spontaneous movements without controlled coördination. There is also a greater impressionability and imitativeness than in the normal child. There is later a lack of inhibition. The normally constructed brain of the healthy child in its motor action presents well-balanced muscular movements. The relationship between muscular activity and brain activity is very direct.

One test that is very useful in distinguishing the normal from the nervous child is the following: Ask the child to stand erect and to raise both arms at right angles to the body and hold them parallel with the palms down. The normal child will hold his arms in this position; in the nervous child, the arms may be curved, one arm may be dropped lower than the other, or where there is considerable nervous tension the knuckles may be pointed backward. These failures to assume the prescribed attitude indicate an illy balanced nervous control.

Neurologists would do well to turn their attention to the Boy Scout movement. Military training not only develops the muscles but the brain as well, and the habit of instant obedience does much to establish a healthy brain activity and normal self control. This self control cannot be too thoroughly established for the growing child, lest an unstable nervous equilibrium will give rise later in life

to the vagaries of the neurasthenic and hysterical. One may find in the nervous child an attitude of erect self-assurance or defiance, or a drooping attitude and self-consciousness, or a lopsidedness in fatigue, the latter being more common in girls than in boys. Another habit easily acquired by the nervous child is that of introspection which readily predisposes him later to unstable equilibrium and self-consciousness to the detriment of efficient mental activity. In a study of 75 or 80 typically nervous children it was found that there was a heredity of insanity or alcoholism in about one-third; the arthritic diathesis in about 30 per cent. In only one case did we get a history of tuberculosis in the family, but there is no doubt that tuberculosis plays a much more important part than this would indicate in the transmission of an unstable nervous constitution. About 25 per cent. of these children gave a history of something abnormal during the pregnancy or delivery of the mother. Faulty metabolism, indicated by headache, constipation, mental depression, irritability, vertigo, a sense of fear, and poor circulation, gives evidence of disturbed nutrition. Defective nutrition was shown in two-thirds of these cases; nearly one-third had night terrors. About one-half gave indications of partaking of a diet too high in proteins. The correction of physical defects, in as far as possible, is the first step in the treatment of these children. Attention to diet and hygiene is important, with special emphasis on the value of fresh air and proper exercise.

THE OPEN-AIR SCHOOL AS A TYPE.

DR. EDWARD DURNEY, Buffalo.—“There is now a type of child segregated and placed in fresh-air schools which we did not formerly recognize. These children may be handicapped from various causes; there is no uniform classification that is applicable to them. The condition of these children may be the result of wrong conditions in the home life; the child may have a heredity of alcoholism or epilepsy, or may be the subject of malnutrition. As a result of such factors the child may show an abnormal nervous activity as a consequence of which its nervous power is depleted and it is easily fatigued. Among these children the largest class are those suffering from nutritional defects and next to these are the ones showing signs of various nervous conditions, such as chorea, partial recovery from infantile paralysis, etc. The first step in dealing with these children is to remove physical defects, after which they may be placed in the fresh-air school. As to the results of this method of handling these children, the attitude of the children themselves is our strongest argument we have. The records of the weight of these children has been kept and it has shown an increase which gives positive evidence of an improvement in physical condition. These have also shown renewed activity in both work and play. A more rapid mental development has also accompanied the improved physical condition. In one instance we had a boy who was nervous and entirely unmanageable and could not be induced to do his school work. He

was placed in the fresh-air school, became very much interested in knitting. This seemed to have a great influence on this nervous condition and he became an entirely different child. The children grow very fond of the open air school and are loathe to leave it. The point may be emphasized that a large proportion of our school children may be cared for in open-air schools to their great advantage."

THE EFFECT OF MALFORMATION AND INFECTION OF THE ORAL CAVITY
OF THE CHILD UPON ITS FUTURE HEALTH.

STEPHEN S. PALMER, D. D. S., Poughkeepsie.—The dental profession has realized and has been preaching for years the importance of a mouth in perfect condition. We know that there is nothing that so reduces the vitality of a boy or girl as decayed or aching teeth. We have noted the effect on the future life of the neglect of the mouth conditions of the child. We know that the mouth is the gateway of the body, that as the teeth are placed there to perform the first function of digestion and assimilation, that with them in a perfect, cleanly and healthy condition only, can the child be in perfect health, and the future man or woman strong, healthy and intelligent. Dr. Victor C. Vaughan says "The mouth is the most important port of entry for infection." "One or more decayed teeth with constant infection so impairs the vitality of the child that physical and intellectual development is impossible." "Deformity of the jaw and malposition of the teeth interfere with the proper development and function of the brains." Dr. Osler says "There is nothing so important to the health of the nation as the hygiene of the mouth." Many other authorities confirm the accuracy of these statements. As physicians and dentists we cannot afford to ignore them. Malformations and deformities of the mouth unless extreme are often not noticeable except to those who have made a study of them. Deformity of the teeth which reduces their function, impairs speech, and mars the facial lines is so prevalent that it is now almost the rule rather than the exception. The reason for the great number of deformities has been attributed to the mixture of blood of different races, as it has been noted that in the Grecian and Roman ages when the blood was purely Grecian or Roman deformities were practically unknown. Dr. Wuerpel says "The best balance, the best proportions of the mouth in its relation to the other features requires that there shall be the full complement of teeth, and that each tooth shall be made to occupy its normal position." The dental apparatus is not a single organ like the eye or the ear, but is a very complex structure with many functions, into which enter not only the jaw, the dental arch, and teeth, but the muscles of mastication, the lips, tongue, nasal passages, palate and throat, and in addition to the function of mastication these are also concerned in the vital function of respiration, and in speaking, singing and whistling, laughing, crying, and in the expression of all the varied

emotions. The different parts entering into the performance of these varied functions and acts are so intimately associated that even slight in harmony in the growth and development of any one may ultimately involve the whole apparatus, interfering with the normal function of all and even producing repulsive deformities. Every tooth of both temporary and permanent dentures has a function to perform, namely, assisting to keep the full denture in perfect occlusion, as the loss of one deciduous tooth before the allotted time results in the eruption of the permanent tooth in malocclusion, and the loss of one permanent tooth results in permanent deformity, which impairs the functions of the whole dental apparatus for all future time. The way to guard the welfare of our patients is to insist upon the care of every tooth both temporary and permanent. Thumb, lip, and tongue sucking habits may cause many deformities in children. The most serious and constant cause of malocclusion is nasal obstruction, namely, adenoids. Adenoids being a trouble of childhood, most active during the growth and development of the denture, it is very important that the rhinologist and the orthodontist should work together. The effect of mouth breathing is to cause contraction or narrowing of the dental arch; the elevation of the hard palate, which causes obstruction of the nasal passages; the obstruction of the tongue, and finally the impairing of the speech and the function of mastication, and the marring of the symmetry of the face. Mayo, Hunter, and others of the medical profession have called attention to the part that mouth infection plays in the health or ill-health of the individual. A child's health is only as good as his teeth. I believe that in malocclusion lies the origin of many mouth infections. Irregularity of the teeth makes cleaning them more difficult. "A clean tooth never decays," is our slogan and to that may be added "teeth in correct position or occlusion are easier to clean, and therefore never decay." If practitioners of the different branches of medicine would unite their efforts, by early oral prophylaxis many of the problems which are baffling the medical world to-day could be eliminated. The law legalizing dental hygienists goes into effect in September and is a step toward the ideal. By our united efforts I prophesy a healthier, stronger, and brighter coming generation.

TYPES OF CEREBRAL DEFECTS IN CHILDREN THAT MAY BE BENEFITED
BY OPERATION.

DR. HERMAN G. MATZINGER, Buffalo.—"I am not concerned with the orthopedic defects of childhood but only with those cases in which head operations are indicated. All cerebrally defective are essentially feeble-minded; many of the worst cases die early in life. Nevertheless we should not discourage any attempts to relieve these sufferers. In the inherited types, including infantile paralysis and Mongolian idiocy, prevention offers the soundest method of cure, while operation remains purely experimental. Proof

is wanting that meningeal hemorrhage gives rise to diplegia. At necropsies, cysts, areas of softening, wrinkling, or adhesions, indicative of more deeply situated pathological changes, were found, but characteristic local pathology, gross or microscopical, of a causative nature were entirely absent. As infantile cerebral paralysis attacks the brain early in life operative relief must be sought early if any good results are to be expected from it. Hemorrhage is a definite indication for operation, and likewise Little's syndrome operation is of no avail where there are early changes in the pyramidal tracts. Increased intracranial pressure adds new symptoms to the old symptom-complexes but is accountable for deaths in only 7 per cent. of the cases. Operation may be attempted for the relief of increased intracranial pressure but it must be remembered that simple incision of the dura is often not sufficient, for fluid may be enclosed in regions away from the site of the incision. Dividing the falx or tentorium may therefore be necessary. Epilepsies develop in one-half the cases of cerebral palsy. The examination of the eye-grounds gives operative indications in infantile cerebral paralysis."

RESULTS OF CRANIAL DECOMPRESSION IN SELECTED TYPES OF
CEREBRAL SPASTIC PARALYSIS DUE TO HEMORRHAGE.

DR. WILLIAM SHARPE, New York.—"I wish to report the results of operations undertaken by Dr. B. P. Farrel and myself for the relief of spastic paralysis during the past three years. I have examined 211 cases of cerebral spastic paralysis and had determined the ophthalmoscopic findings and intraspinal pressure for each individual. I operated upon most of these. The time elapsed since the operations is not great but the results to date are gratifying. I do not operate upon the constitutionally inferior, the microcephalic, or cases of spastic paralysis due to lack of development, the so-called Little's syndrome. I operate on children that have gone through difficult labor and that reveal changes in the optic discs and in the spinal fluid indicative of increased intracranial pressure. Of these the most satisfactory are those with no impairment of mentality. The condition of spastic paralysis following birth trauma may appear before, during, or after birth. The spasticity produces deformities that are usually flexor in type. Later Jacksonian epilepsy may intervene. As these children grow older their mentality is noticeably impaired. They become imbeciles or idiots. It is important to recognize the possibilities of 'hemorrhage of the new-born.' Such bleeding results from rupture of a tributary vein of the longitudinal sinus, from the application of forceps to the child's head, or from other rough handling. The hemorrhage may become cortical or subcortical. In cortical hemorrhage the damage to brain tissue is due to pressure; in subcortical bleeding there is direct injury to brain substance. Motor symptoms follow and depend upon the area of brain impaired. The author holds intracranial hemorrhage accounts for 70 per cent. of the spastic paralyses. The

remaining 30 per cent. include meningo-encephalitis, cases of agenesis, etc. Defects in the pyramidal tracts do not affect mentality excepting through impairments in the associations. Pertussis might give rise to meningo-encephalitis and to spastic paralysis. Treatment accomplishes little in the extreme cases because of the defects in brain tissue. On the basis of the old theory that the brain remains small because the skull is small, treatment was formerly directed toward enlarging the skull. Trephine openings were made and dura was divided. This is wrong, the dura must be left open. I perform subtemporal decompression on one or both sides. Twenty-six per cent. of these cases show increased intracranial pressure. I have had sixteen deaths; of these nine were extreme diplegias. I operated upon three cases on the second day and two on the third day after birth. Improvement was less in the older children, than in those subjected to operation early in life."

DR. C. G. KERLEY, New York.—Reports of Dr. Sharpe's operations are likely to spread rapidly among the people. A vast number of cases should not be included under this operative type. Among them are the mongols, cretins, macrocephalics, the feeble-minded and certain inherited defects. The traumatic cases should be operated upon. Many of these suffered from hemorrhage or transudation following the pressure of forceps or unskilled handling. There are comparatively few who develop spastic paralysis from other causes. Therefore it was necessary to improve obstetrics and to prevent birth palsies. I believe it would be well for every prospective mother to be confined in a hospital by expert attendants. Cesarean section would have prevented many of these traumatic cases. If it is not practicable for mothers to receive this special attention, it is a calamity! It makes little difference whether feeble-minded children were 50 or 75 per cent. feeble-minded so long as they belong in that class.

DR. B. H. WHITBECK, New York said: "The orthopedic surgeon has to deal with the deformities of such children. These cases return after operation and have to be reoperated upon or abandoned. The examination of the eye-grounds confirmed by lumbar puncture determines the selection of the case for Dr. Sharpe's operation. The cases with beginning changes, as congested discs, are suitable ones. A case in which marked improvement followed decompression came under my observation. This child now goes about without appliances. I believe obstetrical trauma is on the increase. Nerve-suture, tenotomies, and the prevention of deformities come to us for correction, but they should not have occurred."

DR. SHARPE, in conclusion, said: "More cases were not included in the operable list because brain losses could not be made good. One can remove an extradural clot and mitigate the effects of hemorrhage. The work of Oppenheim and of Hoch is my authority for 70 per cent. of spastics being due to hemorrhage of the cortex or of the base. Preventive measures should be urged. Cases with increased intracranial pressure offer hope of improvement. In answer to Dr. Nash, some individuals with intracranial hemorrhage

give clear fluid on spinal puncture. The early evidence of hemorrhage is: 1, history of a first child; 2, convulsions after birth; 3, blurring of the nasal half of the optic disc; 4, and increased intraspinal pressure. I used the Strauss needle, placed the child on his side with the spine on a level with head, and the child quiet. The needle was graduated, showing the rush of the fluid from the spinal canal, in centimeters; 8-12 cm. were normal measures of pressure. Above that was pathological. One instance of 37 cm. was mentioned. I found a wet, edematous brain in one case of suspected hemorrhage. Dr. Roby's case belongs to the type that is difficult to restore after birth and that breaks out into a spastic state seven to eight months later. He believed that early operation on selected cases produce normal children."

TOXEMIA OF INTESTINAL ORIGIN IN CHILDREN.

DR. T. DEWITT SHERMAN, Buffalo, read this paper for Dr. I. M. SNOW of Buffalo. The cause of death is shown by experiment to be not due to bacteria but to altered mucous membrane; the injection of fluid from a closed intestinal loop causes death with symptoms similar to obstruction; that much has been learned through the investigations of Whipple, Hartwell, Draper, and others. There is tissue-dehydration and cerebral anemia from failure of absorption and from vomiting. A second theory is that death results from the absorption of bacteria through the damaged mucosa. A third theory ascribed the cause of death to an active toxin. Hartwell holds the toxin may originate from the food, bacteria, or from a substance secreted from the intestine. High intestinal obstruction is considered more poisonous than low. The stagnation of detritus and of bacteria is not considered sufficient to account for the toxin. Hartwell, in his animal experiments, occluded a loop of intestine 10-14 cm. from the pylorus. The animals were made to fast fifty-five hours. All the animals, so treated, recovered from the operations and lived five to seven days. They vomited when given water. There was no peritonitis, and no apparent cause of death. The dogs given sterile water or saline lived longer than those that were not. Hartwell was said to be the only experimenter who worked without damaging the intestinal wall. He, also, eliminated the bile, pancreatic and duodenal secretions from the site of obstruction. A retained secretion, as the gastric, is dangerous to the economy; an injured mucosa fails to alter its poisonous nature but allows it to be absorbed in its toxic state into the blood stream. Hartwell believes, according to the author, that high intestinal obstruction may not produce death when the mucosa is not damaged, that changes in obstruction are found in the liver and in the kidneys, that hematogenous bacteriemia does not necessarily occur, and that bile, pancreatic, and duodenal secretions are not necessary for the production of death in intestinal obstruction because double occlusion of the ileum was lethal. The lethal toxin was the product

of secretion of the injured mucosa or of bacteria. I do not consider that Whipple has excluded bacterial activity in his study of intestinal death. The contents of a closed loop injected into an animal of the same species produced death. If this secretion was duodenal, death occurred in four hours, and in such cases the duodenum was found to be congested.

INTESTINAL OBSTRUCTION IN CHILDREN WITH SPECIAL REFERENCE
TO INTUSSUSCEPTION.

DR. EDWARD W. PETERSON, New York.—“Intestinal obstruction occurs in cases of imperforate anus, congenital bands, acquired intussusception, obturation, volvulus, intestinal paralysis, and infarction of the mesenteric vessels. Congenital occlusion high up in the intestinal tract is difficult to recognize. Intussusception occurs at any age but more frequently early. In the first year the picture is clean-cut, and the mortality was insignificant in those cases that are recognized early and operated upon. If the diagnosis is delayed the death rate is high. No other form of obstruction is more mismanaged and in no other form is the mortality due as much to criminal procrastination. There is obstruction of the blood supply as well as of the fecal current. The obstruction may be intestinal, colic, or iliocolic, simple or compound. Seventy-five per cent. of the intestinal obstructions are in the iliocolic region. As a rule, a well, strong child was seized with abdominal pain, tumor, and bloody stools. The child would become calm after this initial attack. Mucohemorrhagic stools developed two hours after obstruction. Vomiting was prominent, especially late in the disease, but is seldom fecal in character. In every case, there was an abdominal tumor which was admittedly often difficult to palpate because of the rigidity and distention. From the beginning, the pain and stools varied with the degree of the strangulation and the toxemia arose from the injury to the lining epithelium of the gut. Occasionally the symptoms might be less acute; there might be no strangulation of the vessels. One should differentiate purpuric disease. The x-ray helps diagnose difficult cases. The safe method of treatment was open operation and manual reduction. The incision that serves best is one at the midline below the umbilicus or at the outer edge of the rectus. It is important to push and not to pull out the intussuscepted loop. It is well to remove the appendix in all cases for the appendix may be an exciting cause of the obstruction in many instances. After operation water was given and morphine was also administered. I have seen twenty-five cases of which twelve, the successful ones, appeared within an average twelve hours following the obstruction and four within twenty-four hours. Of the twenty-five, nineteen were iliocolic, one was colic, one ilio-ileo-cecal. In conclusion it may be said that intussusception presents a uniform clinical picture, aerohydrostatic measures succeed in a few cases, and early operation with manual reduction offers the best chance of cure.”

THE SURGICAL TREATMENT OF INTESTINAL TOXEMIA.

DR. JEROME M. LYNCH, New York.—“Stick injected the feces of one animal into the same or other animals to show the symptoms following intestinal absorption. Sir Arbuthnot Lane attempted to cure these cases of fecal absorption by improving the intestinal drainage. Other surgeons, lacking the diagnostic acumen and operative skill of Lane, have imitated him with varying measures of success. Wright introduced vaccine therapy. Satterlee of New York tried out colonic vaccine on cases of intestinal stasis. The mixing of the colonic with the intestinal contents, such as occurs in iliocecal insufficiency, may be harmful to the individual, but operations calculated to correct incompetent valves do not seem justified. The physiologists have shown the part played by the cerebrospinal nerves in the control of intestinal movements, on the internal secretions, and on the sympathetic system, but the work of Cannon supported by Bayliss and by Starling would probably bring the greater help to the surgeon. The iliocecal valve is occasionally missing in man. This valve is developed in the third month while the iliocecal junction occupies the upper right quadrant of the abdomen. The terminal ileum is intussuscepted into the colon, and the invaginated portion loses its longitudinal and retains its circular fibers. The mechanism of the intestinal valves is an important factor to be taken into consideration. Many operations have been undertaken for the relief of intestinal toxemia and most of them have been condemned as being unphysiological. We have performed twenty-five reconstruction operations with encouraging results.”

DR. C. G. KERLEY, New York, disagreed with Dr. Lynch's contention that the evidence of intussusception is clean-cut. “In my experience, one child, three days old, presented as symptoms vomiting, abdominal distention without tumor and obstinate constipation. Was that intussusception or what? Surgeons were called in and decided it was obstruction and at operation found a constricting band at the middle of the transverse colon. I saw another case without an abdominal tumor, believed it was intestinal obstruction, recommended operation, and found tuberculosis of the sigmoid with adhesive closure of the gut. Another case at the Babies' Hospital offered intermittent, acute distention and at operation two diverticula were found in the descending colon, one in the ileum, and two in the colon at the orifice of the iliocecal valve. Any obstruction that is not relieved should be operated upon at once. In another instance a child of eighteen months to two years that passed mucus and blood and was without an abdominal tumor was thought to be purpuric but at operation, later, revealed high intestinal obstruction. The diagnosis of intestinal obstruction, in my experience, has not been easy.”

A LANTERN SLIDE DEMONSTRATION OF ACHONDROPLASIA.

DR. CHARLES HERRMAN, New York City.—“This condition was apparently recognized in antiquity as a number of statuettes rep-

representing typical examples have been found in Egyptian and Assyrian tombs. The old masters also frequently depicted this form of dwarfism in their paintings, those of Velasquez being especially well known. On account of their grotesque appearance and liveliness these dwarfs were much sought after as court jesters. The proportions of the different parts of the body in achondroplasia or fetal chondrodystrophy are similar to those of the normal fetus in the early part of intrauterine life. This would suggest a lack of proper growth of certain parts from that time. The writer has had an opportunity to study twelve cases, many having been observed for a number of years. Several misstatements occur in the literature, among them, that the patients are *always* of normal intelligence; that they *usually* show a marked lordosis; that the process affects *only* endochondral ossification, and that therefore the vertebræ escape; that the vast majority of patients are female, and that the proximal portion of the extremity is *usually* shorter than the distal portion. From a study of cases I have found that in a certain percentage of patients the mentality was subnormal; a large number had a flat back, the apparent lordosis being often due to a tilting upward and backward of the sacrum; the vertebræ were sometimes affected; the sexes were almost equally attacked, and in only a small percentage of the patients was the proximal portion of the extremity the shorter."

On a series of slides, Dr. Herrman demonstrated the principal features of the condition, the large head with prominent brow and depressed bridge of the nose, the nearly normal trunk, the prominent buttocks with the saddle due to the tilting of the sacrum upward and backward, the short muscular extremities, with peculiar articulation especially at the knee, the "trident" hand with fingers of nearly equal length, the spoon shape of the hand, and the broad nails, the folds in the skin of the lower extremities, and the normal genitals. The changes in the bones and joints were also shown in reproductions of roentgenograms. The essential feature in the lack of growth of the bones was a disturbance of the normal ossification of the primary cartilage, an absence of the normal columnar formation of cartilage cells. The differentiation from other forms of dwarfism was demonstrated.

DISCUSSION.

DR. GEORGE DOW SCOTT, New York.—"Dr. Herrman characteristically transforms an apparently uninteresting subject into one of life and vitality. Dwarfs, court jesters, entertainers, call them as you like, show us that achondroplasia coexists with brains. The cause of this peculiar condition is unknown whether from local nutritive disturbances in the cartilage, whether from infection both hereditary and direct, whether from intoxication both exogenic and endogenic, whether from genetic influences, race peculiarities, degeneration, defective function of the thyroid, mechanical pressure in utero, syphilis, alcohol, or as the result of other diseases

we know not of, Reisman declares the condition has nothing in common with cretinism. It may be due to hypothyroidism. Many of these abnormalities are born prematurely or are dead at term. If they live they often acquire great strength. We find in both rickets and achondroplasia a shortening of the extremities, in the former due to curvature of the soft bones, in the latter due to insufficiency in the length of the bones. The achondroplasia remains so for life, not so the rickets. In achondroplasia the thyroid gland is found usually normally developed, which is a point against cretinism. These conditions may be related, however, and are often found coincidental."

LEUKEMIA IN A BOY WITH SOME OBSERVATIONS ON BENZOL.

DR. FLOYD S. WINSLOW AND DR. WALTER D. EDWARDS, Rochester.
—Leukemia is a disease of the hematopoietic system characterized by an enormous hyperplasia of the leukocytic elements. In all probability the whole hematopoietic system, marrow, spleen and lymph glands, is involved in every case of leukemia, the essential change being an enormous leukocytic hyperplasia. In some cases the process is localized and proceeds slowly, in others of the lymphoid type it is so rapid as to produce death before there is much involvement of the parts of the blood making system. The etiology of the condition is obscure. Streptococci have been demonstrated in the blood in some instances, but there is a question whether the demonstrated microörganism is the principal infection or merely a subinfection.

The case reported is that of a boy, fourteen years, of age first seen on February 18, 1916. He complained of a large mass in the left side of the abdomen and a general weakness and malaise. His family history is negative except that the mother died of eclampsia and one brother died of convulsions when two days old. The patient gave a history of nose bleed on severe exertion or after eating a full meal, of occasional sore throat. He had two or three decayed teeth which sometimes ached. His present illness began August 1, 1915. He noticed at that time that his abdomen was large and bloated and that there was a lump in his left side. His physician when called to treat him for a cold some four months later found the enlarged spleen. Ophthalmic examination of the fundi showed a typical leukemic retinitis. The heart enlarged slightly to the left, and the apex beat being one inch outside the nipple line. The abdomen was full and protruding, the circumference at the umbilicus being twenty-nine inches. The notch of the spleen was two inches to the right of the umbilicus and the spleen was in contact with the symphysis at the middle line. The liver was enlarged and palpable just below the costal margin. The blood showed 550,000 leukocytes; 2,100,000 red cells, and hemoglobin 60 per cent. The administration of benzol was begun, starting with ten minims a day and rapidly increasing to 90 minims per day. Four transfusions were done, with three possible benefits in view: First, to support the

red cell count as much as possible; second, to prevent any destructive results from the action of large doses of benzol on the red cells; and third, working on the infectious theory as to the cause of leukemia, it was thought that transfusions might be useful. At first the benzol was given with an equal amount of olive oil in capsules. These produced so much gastric irritation that the rectum was tried. The benzol was started when the leukocyte count was 550,000, and there was a primary rise in the white cell count to 900,000 followed by a gradual drop to 220,000. At the present time the general condition of the boy was somewhat improved; he was up and able to be about and had gained seven pounds in weight. The spleen had been reduced to about two-thirds its former dimensions. The blood examination now showed a total leukocyte count of 460,000. The subcutaneous injection of benzol was tried on dogs and on fourteen guinea pigs, in some instances clear benzol and in others benzol and olive oil, and this did not apparently cause any trouble either local or general, corresponding to the experience of Selling. A few subcutaneous injections of equal parts benzol and olive oil, in doses of fifteen minims, were given to the boy without producing any marked local or general reaction, save slight pain at the site of the injection. The drug was tried intravenously on a rabbit with fatal results. Several doses of benzol were then given to two dogs intravenously with like effect, except that with a dose of from five to ten minims the animals would undergo the same violent agitation and collapse, but would recover within a few minutes and show no ill effects of the drug. It required a dose of 3 c.c. of benzol to produce death. The following observations are recorded: 1. Benzol produces marked diminution of white cells and its use is attended with benefit in leukemia. 2. Benzol frequently produces marked irritation when given either per mouth, per rectum, subcutaneously, or intravenously. 3. Benzol is a dangerous drug and its administration should be carefully watched for both the symptoms of benzol poisoning and for a too marked or too rapid reduction of the white cells. 4. Benzol cannot be used intravenously.

DISCUSSION.

DR. JOSEPH ROBY, Rochester.—“The interesting things in Dr. Winslow's and Dr. Edwards' paper have been: 1. The rarity of the condition in children. Dr. Holt's book states that the myelogenous type is more frequent in children, but around Rochester this has not been so. 2. The unusual high count and the unusual size of the spleen. At one time the proportion of reds to whites was about $2\frac{1}{2}$ to 1. 3. The primary effect of benzol seems to have been a distinctly stimulating one. 4. In another case, an adult weighing twice as much as the boy, a smaller dose of benzol reduced the count from 500,000 to 30,000 in a short time. Here the rectal administration of the drug worked beautifully. In this case the blood count has gone back to the place where it was before the administration of the drug. Dr. Winslow is to be congratulated on

his work and it is to be hoped that he will go on and develop some safe and sure method of exhibiting benzol. In both cases I think the blood transfusions had the effect of holding up the red cells, possibly acting as an antitoxin and increasing the general resistance of the patient."

DR. W. A. GROAT, Syracuse.—"I do not believe in using benzol in the treatment of this malady. Benzol is a toxic agent. Benzol may cause a diminution in the number of white cells but that is not curing the disease. If one uses benzol he should watch the urine very carefully. Benzol is just as dangerous in its effect as phenol."

DR. CHARLES GILMORE KERLEY, New York.—"I had one case of leukemia which I might add to this report. This occurred in a child four years of age. This child showed the characteristic symptoms of this condition; the leukocytes numbered 200,000 and there was a diminished number of red cells. After the administration of benzol there was an increase in the red cells, a decrease in the white cells and the size of the liver diminished. The benzol was given in small doses on a full stomach and the child was carried along in this way for some months and did fairly well. It then failed rapidly and died."

THE CELL COUNTS OF CEREBROSPINAL FLUIDS.

DR. JOSEPH ROBY, Rochester.—The purpose of this paper is three-fold: To defend more or less, a statement made in an article in the *Journal of the American Medical Association*, to mildly criticise Abrahamson, DuBois and Neil for their technic in estimating cells, to repeat the detail of making a cell count of spinal fluid and to demonstrate the apparatus used in searching for the tubercle bacilli, and finally to show some preparations of tubercle bacilli actually found.

Spinal fluid removed by lumbar puncture will be one of four kinds macroscopically: Distinctly cloudy and even pussy, slightly hazy, bloody or perfectly clear, with possibly some flakes in it when examined by transmitted light. A cloudy fluid means a meningitis caused by the meningococcus, the pneumococcus, the influenza bacillus or one of the pus-producing organisms, usually a streptococcus. When the fluid is distinctly cloudy it is allowed to stand a short time and the clot or sediment should then be smeared thinly on slides, dried and stained, first by Loeffler's, and then if the diplococcus was found by Gram stain or even a capsular stain if the organism looks like a pneumococcus. It is not necessary to count the cells in this sort of fluid. A slightly hazy fluid may mean the early or late stage of one of the groups already mentioned, the admixture to a perfectly clear fluid of a trace of blood, serous or tuberculous meningitis. It was here that the count would be of value. If there were quite a good many red cells and few white ones it surely ruled out a meningitis due to the first set of organisms. With a distinctly bloody fluid one could also proceed as with a perfectly clear fluid. A perfectly clear fluid or one containing a few

flakes might be any of the following: Normal cerebrospinal fluid, meningismus, functional nervous disease, epilepsy, chorea, tetany, spasm, etc., hydrocephalus, serous meningitis, a brain tumor, brain abscess, poliomyelitis, syphilis or tuberculous meningitis. Often bloody fluid is rejected by the examiner for counting purposes but it need not be, for all one had to do was to subtract from the white count one white for every thousand reds counted. Then for a second count of this bloody fluid, for the slightly hazy fluid, and for the clear fluid, a white cell pipette and a staining fluid are used. The staining fluid used by Swift and Ellis was used, consisting of two-tenths of a gram methyl violet, four-tenths acetic acid and 100 c.c. distilled water. This dissolved the red cells and stained all the other cells a bluish purple. With spinal puncture on the functional nervous diseases the writer has had no experience except in chorea and spasms, and in these there has been no increase in the cell count, nor is there any increase in hydrocephalus. If there is such a disease as serous meningitis not due to the tubercle bacilli it is rare. In brain tumor the writer finds no increase of cells. These findings do not agree with those of Pfaundler and Schlossman, who found an increase of cells in functional nervous diseases and brain tumor. In poliomyelitis the writer's experience is limited to three cases, counting in one acute case 154 cells, in a case with an exacerbation of fever on the tenth day sixty-two cells and in a case of facial paralysis alone ten days after the onset ten cells. Peabody, Draper and Dochez give the average as 125 in fifty-four counts of forty-three cases in the first week of the disease, the highest being 1221, the lowest seven. Calling five cells normal every case showed an increase in the first week of the disease. In syphilis the writer has never found more than one hundred cells, and usually thirty to fifty in cases of tabes and general paresis. In tuberculous meningitis the limits of the counts in the writer's experience have been forty-five and 454, the vast majority running between one and three hundred. From these findings it may be concluded that in distinctly cloudy fluids it is not necessary to do a cell count. Smears may be made, cultures made and the organism searched for. In treating a case of epidemic meningitis a cell count from day to day would probably show the progress of the treatment. Cell counts above five are abnormal, and certainly those above ten are abnormal. The cells should be counted accurately by a blood counter, not centrifuged and estimated. A clear fluid having a count of five or below might be meningismus, functional disease such as chorea, epilepsy, tetany, or spasms, hydrocephalus, brain tumor, or brain abscess. The cell count will not absolutely differentiate syphilis, poliomyelitis, and tuberculous meningitis, but a cell count between five and fifty would probably be syphilis or poliomyelitis; a cell count between 100 and 300 would in the majority of cases be tuberculous meningitis. Taken in connection with the onset of the disease and the clinical symptoms it ought not to be difficult to make a diagnosis of tuberculous meningitis by a cell count alone, even if tubercle bacilli are not found. In searching for tubercle bacilli

the film method modified by the glass cylinder and cover slip had been most satisfactory.

ECZEMA IN INFANTS AND YOUNG CHILDREN.

DR. CHARLES GILMORE KERLEY, New York.—Eczema in young children may be due to widely different causes. It may be the expression of faulty processes relating to food utilization or the evidence of an immediate reaction against specific food substances. On the other hand, it may be due to conditions entirely external, external irritations being capable of causing very active reactions. The application of strong soap, liniments or mustard may cause eczema, also woolen garments, exposure of the moist skin to cold air, excessive perspiration, parasitic disease, or discharges from the navel, ears, or nose. Eczema from immediate intestinal sources, so-called intestinal indigestion, is very unusual. There is a wide variety of foods that may produce eczema. A child may react to the smallest quantity of a given food or it may possess a tolerance for a food up to a certain amount; if this amount is exceeded there will be a skin reaction. I have repeatedly known children to tolerate eight, ten or twelve ounces of milk daily, but when a larger amount was given, eczema resulted. In these cases by a very gradual increase in the amount given, a tolerance may be established. Whole milk in sufficient amount for nutrition may eventually be taken without inconvenience. Some infants possess no tolerance whatever for orange juice; in some infants it causes a reaction in the form of red scaly patches about the mouth and erythema of the cheeks and other parts of the body. Beef juice acts in like manner and I have patients under my care who cannot take a particle of manufactured sugar but who show no inconvenience in the use of honey or maple sugar. Butter fat, milk and cane sugar, eggs, and orange juice, have been proven through processes of elimination to be the most frequent dietetic causes of eczema in observations covering a large number of cases. Cows' milk protein is a rare cause of eczema and if it is cooked it is still less frequently a factor. The Schloss scratch skin test for proteins has been of very little value in determining protein capacity in infants for the reason that there are many cases not anaphylactic to protein that will tolerate but a given amount. Children showing a decided reaction to a specific protein may be immunized through small doses to a tolerance of the food reacted against. In addition to eczema, asthma and urticaria are not infrequent results of protein incapacity.

Cases of eczema due entirely to external agencies are readily relieved by removing the source of the trouble and by the application of protective dressings, soothing or stimulating in character. The most difficult of relief is the eczema intertrigo in infants. In these the child is taught to evacuate the bowels night and morning. Over the genitals a large bunch of absorbent cotton is placed to catch the urine and citrate of potash is given internally. As a protective dressing unguentum aqua rosæ to which white wax is added in the

proportion of 10 per cent. is used. The involved areas must be protected from scratching and irritation. In eczema in breast fed infants the first step is to examine the mother's milk and if a high fat content is found to reduce it through dieting processes if possible. These children may be improved but rarely cured. The baby will almost always be cured by weaning and suitable bottle-feeding. However, it is not advisable to wean a thriving baby because of eczema. In the bottle-fed the best results have been obtained by the use of plain skimmed milk or evaporated skimmed milk, cooked with starch, preferably rice or wheat. A high protein and a high starch food is given, often with the addition of olive oil to raise the caloric content. As early as the seventh month, squash, stewed carrots, and mashed potato are added to the diet. The salt of fresh vegetables possesses an undoubted therapeutic value. In older children past the bottle age the treatment is along similar lines. Skimmed milk, puddings made from skimmed milk, all the bread stuffs, all cereals but oatmeal, all vegetables, usually twice a day, chicken occasionally and butcher meat rarely. Everything given is largely sugar-free. Among the drugs for internal administration citrate of potash sufficient to neutralize the urine is the most valuable. Not all cases of eczema admit of cure, but all might be cured if we dared draw our dietetic lines sufficiently rigidly. This might mean a clear skin but it would be at the expense of a certain degree of faulty growth and malnutrition. There are cases it is not well to cure completely. Proper growth and right development are more important than personal appearance. The successful management of eczema of internal sources depends upon our ability to discover the disturbing food factor, to eliminate it if possible, or to immunize the patient to it. I am not in accord with any theory relating to a special constitutional state such as the exudative diathesis as necessary for eczema, because a combination of high butter fat, high sugar of the arts, orange juice, and beef juice will produce an eczema in many children who never show the condition when normally fed, and because eczema may be produced by many foods of widely varying types. Not every child, however, would react to all these foods. The so-called exudative diathesis may be produced at will by the administration of certain food substances in a great majority of children. One cause for the frequency of eczema is the inability of the child to adjust himself to the many varieties of foods and food elements that are given him, whether natural or artificial.

DISCUSSION.

DR. GODFREY R. PISEK, New York.—“Dr. Kerley has given us a most practical and common sense paper. He has further outlined the ideas which he has been giving us from time to time. There are one or two statements which might be brought out in connection with the difficulty in feeding these cases. Dr. Kerley said that these children lost weight when put on a diet that controlled the eczema. We can, however, hold the weight by giving skimmed milk without

any diluent or sugar. Sometimes small doses of thyroid are helpful, grain $\frac{1}{10}$, or $\frac{1}{20}$ in obese children particularly. So far as the inter-trigo is concerned, one can get a very rapid change in this condition by exposing the parts to air as we are now doing in the case of burns. Exposure to air and moderate sunlight give good results and cause the skin to dry and heal. By placing the child on a rubber ring air cushion in aggravated cases the irritation of a diaper may be avoided. As to ointments any of the bland ointments usually employed that would afford protection to the sensitive skin were suitable. Another point was that it was advisable to keep up the treatment for a while after a cure had been effected in order that the sensitive skin might be protected for a while longer. With reference to the exudative diathesis Dr. Kerley is right; it does not cause eczema. It is faulty feeding that causes this trouble. However, children with the exudative diathesis do more readily acquire eczema if improperly fed. There is still another point and that is with reference to the nursing mother. One should question her carefully as to her diet for it can sometimes be brought out in this way that she is taking an unbalanced diet and has a dislike for some form of food or an abnormal craving for sweets which can be removed and will assist in correcting the eczema in the child."

DR. CHARLES HERRMAN.—"Dr. Kerley has had a large experience with these cases and I only wish to discuss one point; that is with reference to what he said about the exudative diathesis. Many of these cases had nothing to do with the exudative diathesis; they were due to local irritation, but there is a constitutional state which may be spoken of as the exudative diathesis. I had occasion to study a series of babies and to follow them up. In a series of about 200 babies 25 per cent. showed a distinct exudative tendency. I would like to ask Dr. Kerley whether in following these children through a series of years they have shown other peculiarities than the skin disease. Dr. Kerley himself reported cases of recurrent bronchitis and stated that these children had had eczema in childhood. One sometimes saw a child breast-fed and with everything apparently all right and yet with a tendency to sprue during the first two weeks; they seemed to have a peculiarly sensitive skin and respiratory system. I do not think thyroid deficiency is an important factor in eczema."

DR. CHARLES GILMORE KERLEY.—"As regards the use of thyroid extract, I tried it but without very definite results. It never seemed to give sufficient relief to make me feel that I could advocate it. In growing children, not babies, showing malnutrition and a tendency to rough scaly skin, I have used $\frac{1}{15}$ or $\frac{1}{20}$ of a grain two or three times a day, and it may help in this kind of a case. It should not be given in large quantity as it is a great stimulant and produces wakefulness in a child that is not appreciably abnormal. Children with eczema are likely to have the associated conditions, urticaria, cyclic vomiting, and a tendency to take cold easily. That type of child is susceptible to food influences and should be treated along lines similar to those outlined in the paper. I have never been able to

bring these conditions together under a symptom-complex or to consider them as a clinical entity. Czerny and others have tried to take in too much and to prove a symptom-complex, but there is no one single term or condition that will include all of these cases."

HYPERTROPHIC STENOSIS OF THE PYLORUS IN CHILDREN.

DR. ALFRED HAND, JR. Philadelphia, (by invitation)—"Why we are seeing cases of hypertrophic stenosis now is a puzzle. I have been looking for these cases for ten years, ever since the British Medical Association met at Toronto when we heard a great deal concerning this condition. Up to that time hardly a case had been recorded in this country. About a year ago I had a case which I reported before the American Pediatric Society in May, 1915. Last September I had two cases in one week. Last week when I was preparing to come here a child was brought into my office with this condition. The diagnosis is either easy or difficult, according to the stage of the condition, and the specialist in children's diseases does not usually see these cases early, so that it is often easy for him to make the diagnosis. When he is consulted at the time of initial vomiting it is more difficult. The history of these cases shows great uniformity. The condition is much more frequent in the male sex. The majority of breast-fed infants progress satisfactorily for from two to six weeks before the vomiting begins. A valuable point in distinguishing hypertrophic stenosis of the pylorus is the projectile character of the vomiting but this is not sufficient for making a diagnosis. Some children vomit and lose weight until the irreducible minimum is reached. The constipation is obstinate and persistent but not absolute. Laxatives may only serve to increase visible peristalsis. The tumor if present may be felt by deep pressure in the hypochondrium. Palpation does not as a rule present great difficulties. By gentle manipulation relaxation may be obtained. Then with the right hand in the hypochondrium the tumor may be located somewhere between the midline and the right flank. When one has located it it is possible to detect a hard, almost cartilaginous lump, characteristic of the growth. I believe the history of these cases shows that the hyperplasia is progressive. When all these symptoms are present there is no question of the diagnosis. In the early stage it must be differentiated from catarrhal gastritis and spasm of the pylorus. In dealing with this condition medically all one's resources may be taxed. No stated rules can be laid down for the dietetic treatment of these cases, but I would urge that in every change of diet we should be guided by some definite reason. At the Drexel Hospital in Philadelphia they have operated upon fifteen cases with two deaths. I have had four patients, two bottle-fed and two breast-fed babies. They all required stimulation after operation, while on the table. We now use the operation of Oschner. All my patients did well and were in fine condition but one, and that one occasionally vomited bile."

DISCUSSION.

DR. GODFREY R. PISEK, New York.—“I like Dr. Hand’s term ‘persistent spasm of the pylorus’ as it is more descriptive of the condition than simply pyloric spasm or stenosis. I would like to say that we do undoubtedly have cases of pyloric spasm (persistent in character), that get well under medical treatment by lavage, alkalies and diet. We may carry these children along by such methods that the defect is corrected, then the weight will gradually go up, the child no longer vomits and slowly makes a recovery. This has happened in a number of cases that have come under my observation. We have in this condition of pyloric spasm a clinical entity. The x-ray is of distinct value in distinguishing between pylorospasm and true stenosis. In the case of spasm there is a retardation of the food, but when the spasm is relaxed it may be seen passing through the pylorus. With stenosis three hours after feeding no food will be found extruding through the pylorus, and when we find this condition we should lose no time in handing the child over to the surgeon for the Ramstedt operation. This surgical procedure is the best one we have, for the surgeon can get to the site of the trouble, rectify it and get out in a very short time, and the child will be subjected to very little shock. It can be done in twenty minutes or less and is far preferable to a gastrojejunostomy.”

DR. EDWARD W. PETERSON, New York.—“I wish to speak of the Ramstedt operation for hypertrophic stenosis of the pylorus. I suppose Dr. Hand is familiar with the work of Dr. Downes who recently reported that he had employed this operation in upward of sixty cases with a very slight mortality. This operation was performed by making a simple incision through the hypertrophied muscle fibers being very careful not to cut into the lumen of the gut. In a case in which I recently operated it took just eight minutes to complete the operation. The after care of these babies is very important. It is important to get in fluid after the operation. I do this by injecting, 150 c.c. of saline intramuscularly with a record syringe. The saline is very quickly taken up when given intramuscularly, much more quickly than when given subcutaneously. The after-treatment of these cases is well covered by Dr. Morgan in a recent article on this subject. It is just as essential to have these children properly fed and handled after the operation as that they should receive prompt surgical treatment.”

DR. CHARLES GILMORE KERLEY, New York.—“Every one who had to deal with these cases should read Dr. Morgan’s article. I had one case of hypertrophic stenosis which I lost by temporizing. This patient was an only boy and I had him in a private sanatorium where he had a wet nurse and was being treated with stomach washings. The stools were pretty good and the child was not losing weight and this gave me the idea that the child was doing well. This child died very suddenly. At autopsy it was found that the pyloric end of the stomach, for nearly one-third of the stomach, was infiltrated and edematous, and there was some thickening of the

pylorus. I saw another case do exactly the same thing. The people were not anxious to have an operation and we temporized until the child was almost dead. Dr. Downes then operated and this was one of his fatal cases. These cases have made me afraid of cases of hypertrophic stenosis that are apparently doing well. In this last case I found that there were some changes in the liver and kidneys, similar to those in acidosis but not just like those of starvation acidosis. This experience has made me feel that if one is temporizing with a case of this kind he should not be too optimistic."

DR. CHARLES HERRMAN, New York.—"As to the frequency cases of hypertrophic pyloric stenosis, I think they are very rare. We get a false impression as to the frequency of this condition. Dr. Downes has reported sixty cases up to the present time in which he has used the Ramstedt operation. It should be remembered that he operates on 90 per cent. of all cases in and about New York. If one does not take this into consideration he gets a wrong impression as to the frequency of this condition. I see a great many babies and I see on an average only about two cases of hypertrophic stenosis of the pylorus in a year. There is no question that the Ramstedt operation is the operation of choice, because it can be done so rapidly. There is one drug that has been used with great success in this condition and that is papaverin. But a very much better way is to be on the safe side and recommend operation, since it is difficult clinically to distinguish between pylorospasm and hypertrophic stenosis of the pylorus."

DR. T. WOOD CLARKE, Utica.—"Dr. Hand said that from what he had heard at the meeting of the British Medical Association in Toronto and from the literature he was led to believe that hypertrophic stenosis of the pylorus was more common in England than in this country. I had a hospital experience at Ormsby, and during three years saw eight cases, while during my connection with the Vanderbilt Clinic I saw only one case, so I think the disease is more frequent in England. In doing work on gastric acidity I had one case with very high hydrochloric acid content and I am becoming convinced that this condition may be due to hyperacidity with spasm, which have not gone on to hypertrophy, ordinary lime water increased the acidity but sodium citrate decreased it. It seems to me that children with pylorospasm might do well if fed on skimmed milk, with three or four times the ordinary amount of sodium citrate. I would like to see this tried. Of course the cases showing signs of stenosis should be operated upon."

DR. STEPHEN L. TAYLOR, Kenwood, and DR. BRYON C. DARLING, New York.—"With the advance made in the treatment of tuberculous disease of the vertebræ and the improvement in the methods of diagnosis, it still happens that the appearance of a fluctuating mass in the groin or elsewhere is the first suspicion that the physician has of the real nature of the trouble he is trying to treat. If it is possible to make a diagnosis before the bodies of one or more vertebræ are destroyed, it is obvious that much has been done to prevent the two most serious results of the disease, severe deformity

and general tuberculous infection. While Pott's disease may occur at any age it is essentially a disease of childhood, for 90 per cent. of the cases occur before fifteen years of age. There are many instances of error in diagnosis recorded and they seem to be more frequent in adults than in children. Before the appearance of a kyphosis or the development of an abscess the symptoms shown by the child are very indefinite and unpronounced and are often overlooked. Usually the mother who is keen to observe any thing unnatural in her child's behavior will call attention to one or more of the following early symptoms, general debility, pallor and failure to gain in weight, lack of interest in play, disinclination to run or jump, unnatural attitude, change in gait, night cries, or paroxysmal abdominal pain, or persistent attacks of pain in the chest or stomach, or grunting respiration. These symptoms should arouse suspicion and the child should be examined with the clothing removed. It will then be noticed on inspecting the spine that the head may be held to one side or the chin thrown back, or there would be a tendency to support the chin with the hands when sitting, when the disease is cervical. If the lesion is in the dorsal region, the most usual location in children and the most difficult for early diagnosis, one or both shoulders may be elevated, the spine is held rigid in walking, or the child places the hands on the thighs to relieve the spine when sitting. There may be a slight lateral curve. If the disease is lumbar, there is an exaggeration of the normal lumbar curves, throwing the abdomen forward. In asking the child to pick something up from the floor there is a characteristic squat instead of stooping. If the hand is held over the spinous processes, when the disease is dorsal or lumbar, it may be possible to discover that when the spine bends several of the vertebræ move together, or, in carefully inspecting the spine when the child is leaning forward, the curve of the normal flexible spine is interrupted at some point. The degree of extension of the spine and the amount of lateral motion may be tested with the child lying prone with face downward. The presence or absence of psoas contraction may be ascertained in this position also. In the analysis of a large series of cases, J. Hilton Waterman and Charles H. Yager found that in young children the most frequent symptom was unnatural attitude and next in frequency was pain. The pain in Pott's disease is due to the sensitive articular surfaces and to irritation of the nerve roots. The former accounts for the muscular rigidity and the effort of the child to protect the motion of the spine in every way. The latter accounts for the location of the pain in so many parts of the body, it being referred to the periphery of the irritated nerve. Pott's disease in its early stage may closely resemble the following conditions: rickets, suppurating glands of the neck, lateral curvature, a weak and atonic condition, infantile scorbutus and sarcoma of the vertebræ. A case has been reported in which paroxysmal abdominal pain with extreme pain in the region of left ureter left the diagnosis in doubt for some time, but the spine was finally suspected. The differential points in sarcoma of the vertebræ are the greater severity of the pain, the

more rapid development of the symptoms, the failure of immobilization to relieve pain, the local tenderness and the early development of cachexia and paralysis. Repeated x-ray examinations are necessary. In torticollis, which may be mistaken for cervical Pott's, the face is turned away from the contracted muscles, and passive motion is restricted in one direction only; in Pott's disease in all directions. There is no pain in the neck, while pain is usual in cervical Pott's. Hip joint disease may simulate Pott's disease, but in Pott's disease there is not the pain in bearing the weight on the affected limb. In hip disease passive motion is restricted in all directions; in Pott's, rotation is not restricted and other motions are normal when flexion is increased. Sacroiliac disease might be mistaken for Pott's but is a rare condition and would show tenderness over the diseased joints and the spinal rigidity would not be so marked. An arthritis affecting the spinal joints is unusual in children and would show involvement of other joints. In spondylolisthesis the discomfort and pain and the exaggeration of the normal lumbar curve may cause it to be mistaken for lumbar caries. The x-ray would aid in the diagnosis. The increased lordosis which is present with pseudohypertrophic paralysis may resemble the deformity of Pott's disease in the lumbar region. The absence of pain and muscular rigidity, the shuffling gait and the hypertrophy should make the diagnosis easy. Other conditions which are unusual but which it may be necessary to exclude in children are typhoid or neurasthenic spine, syphilis affecting the spinal articulations, acute aneurysm, osteomyelitis and injury of the spine.

The variety of conditions that may be mistaken for Pott's disease and the cases cited showing the possibility of error in diagnosis impress one with the necessity of making the examinations of all sick children. Observation for a period and repeated examinations will be found necessary to arrive at a diagnosis in many instances. A number of these conditions referred to could be excluded by the discovery of muscular rigidity. In doubtful cases the x-ray is often helpful though if negative in the early stages it is not conclusive. Pictures should be taken in the anteroposterior position as well as in the lateral, and repeated x-ray examinations are often necessary."

DR. BRYON C. DARLING, New York, gave a lantern-slide demonstration illustrating the point brought out in the paper.

A SCHEME OF STATE CONTROL FOR DEPENDENT INFANTS.

DR. HENRY DWIGHT CHAPIN, New York.—(See *Medical Record*, June 15.) "You are all familiar with the high mortality of infants in institutions. Statistics from eleven institutions show that they lost one-half their babies during a period of five years. In a general way it may be said that about two-thirds of the babies are discharged from hospitals and institutions by death. A baby in a home with a poor mother is better off than a baby in an institution. The baby needs some handling and mothering which the poor mother gives it, but which it seldom gets in an institution. There is greater danger of

infection in an institution. If vulvovaginitis occurs it is nearly always specific. These babies have a poor vitality and if they acquire an acute infectious disease they seldom survive. The retardation in development which a child sustains from life in an institution can rarely be compensated for later in life. The best way to overcome the handicap which the institution imposes on the child is to abolish institutions for the care of infants. It is more difficult to be constructive than destructive, so the plan which I present is based on the results of practical work. Under the auspices of the Speedwell Society I have conducted a practical experiment at Morristown, N. J., in boarding out of dependent babies. The babies are boarded out under the supervision of a doctor and a nurse. The nurse makes a daily visit to each baby, and in this way exerts a control over the home conditions. The great drawback in most instances in which infants have been boarded out is that there is insufficient supervision. The boarding should be done in units so that it will be possible to provide the necessary medical and nursing supervision. Such units should be distributed along the lines of transportation. Thus we may have one near New York, one at Albany, Syracuse, Rochester, Buffalo, Binghamton, Watertown, etc. In addition to the great advantages that such a plan offers for the babies the financial side of the question is not unworthy of note. New York State now gives over \$4,481,000 to five institutions for the care of dependent children. This sum would pay all the expenses of the plan I have suggested, including salaries of nurses, doctors, board for the babies and transportation expenses incident to the work, and there would be considerable money left. Furthermore, such a plan would save to the tax-payer the increased tax rate made necessary by the fact that such institutions pay no taxes; it would save heavy overhead charges incident to conducting large institutions and the interest on large amounts of capital now tied up in buildings. The money spent out for the care of the babies would go into poor families where it would be a great help."

PIN WORMS AS A CAUSE OF APPENDICITIS.

DR. ALFRED W. ARMSTRONG, Canandaigua.—"If the sale of worm-powders indicates what mothers believe, it is quite evident that a great majority of them have been convinced in some way that intestinal parasites exist and that they produce symptoms of disease which are relieved by so-called "worm-powders." In the city of Canandaigua every year there are sold enough doses of worm medicine to supply ten doses to every child between one and fourteen years of age. In olden times people looked upon intestinal worms as the source of all evil; now the pendulum has swung the other way and they are considered to produce serious lesions only rarely. Pin worms are understood to be the most common of the intestinal parasites found in children and they generally inhabit the lower portion of the colon, although they sometimes may be found in the small intestine, the stomach, and not very infrequently

in the appendix. My attention had been called to this subject by four cases of appendicitis in children which I have seen. These cases all had classical symptoms of appendicitis. After the removal of the appendices there had been no return of the old symptoms. This we generally considered as evidence that the cause of the disease has been removed. It is of interest then to consider whether these worms may inhabit the appendix under normal conditions, whether they are there by accident, whether they precede the advent of inflammation of the appendix, whether they are capable in themselves of entering the mucous membrane and producing disease, and whether they can produce more than one type of disease in the appendix. It does not seem quite fair to consider the existence of parasites in the intestine to be a normal condition, even though it might be an unusual one. Their presence in the appendix is admitted by all to be rare and, yet if it is true that the female lives in the cecum until impregnation takes place and then moves toward the rectum, it is easy to see how the appendix might get its share. There seems to be some dispute as to whether the whole life history may be completed in the colon or whether the ova must be swallowed. Frequent reinfections which occur would seem to make it clear that the latter is not uncommon. The literature on this subject seems to be limited to reports of only a few cases where the oxyures have been found in the appendix and most of the observations which have been recorded have been made in Europe. Bacterial infection is of course the real cause of appendicitis but with the presence of numerous forms of bacteria constantly in the intestinal canal, we must account for their sudden activity on the occasion of an acute attack of appendicitis. There seems to be a pretty well established type of appendicitis in which the oxyures have been found which is characterized by considerable pain without any marked inflammation. A peculiar change occurs in these cases, viz. extensive destruction of the mucosa without any sign of inflammation. In these cases the gross appearance is one in which small hemorrhagic areas appear in the mucosa and are confined to that part in which the worm is found. The consideration of this subject I believe suggests the following practical thoughts in the treatment of intestinal diseases in children: (1) The possibility of the presence of pin worms in the intestine of children should not be disregarded. (2) Appendicitis is one of the more serious results of parasites in the appendix. (3) Treatment directed against the oxyures may save some child from the necessity for the removal of his appendix."

DISCUSSION.

DR. FREDERICK H. FLAHERTY, Syracuse.—"It has been known for a long time that so-called pin worms have been found in the appendix. To get a clear idea of their relation to appendicitis we must consider what are the causes of appendicitis. Many causes have been given, but I believe there are always two groups of causes, the exciting cause and the underlying cause. A study of the anatomy of the appendix shows that it has a poor circulation which

favors inflammation, and this plus the exciting causes produces appendicitis. Foreign bodies in the appendix are not as common as is thought. In a series of 500 acute cases in which the appendix was examined there was only one in which pin worms were found. If pin worms are in the cecum it is easy to see how they may get into the appendix. In my case there were two masses of worms, each containing from thirty to forty worms, and these precipitated the inflammation. What Dr. Armstrong has said about the infrequency of appendicitis among the Chinese is true because there is a difference in the anatomy of different races. The American Indians rarely have appendicitis. Another point to which I wish to call attention is with reference to the diagnosis of appendicitis in children, and that is that the rectal examination is as valuable as any other one method of examinations in detecting an inflammatory mass in the abdomen."

DR. EDWARD W. PETERSON, New York.—"I can only say that we have had several of these cases and may have had more in the babies' service, but this is one of the rare causes of appendicitis. Several articles have been written on this subject, one several years ago entitled "Pin Worm Appendicitis," in which two cases are reported. In another case we were operating for hernia and the sac was large so we thought we would take out the appendix as a prophylactic measure. Upon opening the appendix we found about one-half dozen pin worms. This case was reported in the *New York Medical Journal* several years ago. The finding of pin worms in a few cases is not conclusive evidence that they are a causative factor in appendicitis. It might, however, in children be well to take the precautionary measure of giving the appropriate treatment for pin worms before operating for appendicitis. As a rule the habitat of the pin worm is in the cecum."

DR. T. DEWITT SHERMAN.—"I want to emphasize what Dr. Peterson has said and to point out that we do not examine the stools as often as we should. Again it depends on the sex of the pin worms whether the treatment is going to do any good. The males stay up in the cecum and the females travel down. If one has a focus of males the treatment will be of no avail."

TYPHOID FEVER IN CHILDREN.

DR. GEORGE C. SINCERBEAUX, Auburn.—The purpose of this paper is not to state anything new in the diagnosis or treatment of typhoid fever but to emphasize the importance of the milk supply and to give a few facts gathered from an epidemic in Auburn in the past year. Typhoid fever in children while in many respects resembling that of adults, has many symptoms less characteristic. It is rare before the age of two years and after fifty years. The pathological findings in children are less typical than in the adult. Ulceration while not infrequent, was often wanting. Sometimes there was only moderate swelling of the redness of Peyer's patches, solitary glands, mesenteric lymph nodes, in fact there might be no lesion in the intestine at all. The spleen was soft and enlarged, although

often much less than in the adult. In the more severe cases degenerative changes in the liver, kidneys, heart, salivary glands and pancreas took place. There might be hyperemia and edema of the cerebral substance, or lobular and bronchial pneumonia with hyperemia of the bronchial mucous membrane. There might be hypostasis and bronchial edema with ulcerative changes in the larynx and esophagus.

In some instances periostitis and bone changes might follow. The course of typhoid fever in children is relatively mild except in infants, and is liable to be shorter than in adults. The prodromal symptoms are slight. Headache, nose-bleed and diarrhea are rare. The attack is usually ushered in by slight malaise, gastrointestinal disturbance, vomiting and constipation, the diarrhea, if any, appearing later. The temperature rises slowly for the first few days running evenly with slight morning remissions during the second week and declining slowly until normal at the end of the third week. The tongue may be clean but more often was covered with thick white covering, with clean tip and margins often exhibiting the V-shaped red places or typhoid triangle in the center of the tip, which is claimed to be pathognomonic. The pulse is usually slow in relation to the temperature, unless there are certain heart changes. The younger the child the less the nervous symptoms, usually the only evidence being an apathy and restlessness at night, except in severe cases, in which one might see tremor of the hand, picking of the bed clothes, delirium and convulsions, and other evidences characteristic of meningeal irritation. Intestinal hemorrhages and perforation were rare except in older children. The mortality of typhoid fever in children is small, ranging from 2 to 9 per cent. The course of the temperature, steady increase in the size of the spleen, and eruption of areola, usually appearing in the second week, together with the Diazo and Widal reaction usually clears up the diagnosis. The disease most likely to be confused with typhoid fever in children is miliary tuberculosis. But in this disease there is the irregular temperature, the spleen is not apt to be so enlarged, the Widal reaction is negative and there is an absence of the bacilli in the blood. My treatment might be regarded as empirical, but during the past few years I have been using collargolum and colloidal silver, $\frac{1}{2}$ to 1 grain, in capsule every six hours and salol, in 1 to 2 grain doses, every four hours. The diet consisted of boiled water in plenty, milk, broths, gruels, egg-nogg, cereals cooked six hours, orange juice and home-made ice cream. In the Auburn epidemic there were thirty cases reported, of which sixteen occurred in children under seven years of age, the youngest being nineteen months. An investigation traced the source of this epidemic to milk from one creamery, and it was learned that on one farm supplying milk to this creamery the son of the owner had had typhoid fever. Admonition was given the people to drink only distilled or boiled water, and milk from this creamery was ordered pasteurized. Investigation of the farm to which the infection had been traced revealed the presence of two wells with polluted water. In order to lessen the chances

of cases and carriers of typhoid fever and to control them when once they were known, the following means would be found effective: 1. Cleanliness in milk production. 2. Vaccination of dairy employees against typhoid fever. 3. Isolation of infected persons. 4. Official supervision of dairies during the presence of illness. 5. Official supervision of the pasteurization of all milk.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Meningococcus in Nasopharynx of Cerebrospinal Fever Contacts.—Over 2000 throats were examined by J. McIntosh and W. E. Bullock (*Lancet*, Nov. 27, 1915) for meningococcus, and of actual contacts 5.5 per cent. were found to have meningococci in their throats. In the various batches examined the percentage of positive results varied from 0 to 25; the highest figures were only found when the epidemic was at its height, and where there was considerable overcrowding and therefore a close association between patient and contacts. If the high percentage of positive contacts found by some workers approximates the real facts, then, apart from the difficulty of examining the huge number of contacts in a large epidemic, the isolation of carriers becomes impracticable. But we are convinced that meningococcus carriers are less frequent than is generally believed; and given an easy, rapid, and definite means of detecting the meningococcus in the nasopharynx, it should be possible to check an epidemic of cerebrospinal fever in any small community or body of men where the movements of individuals are under control.

Method of Vaginal Washing in the Diagnosis of Gonococcus Vaginitis.—M. E. Trist and J. A. Kolmer (*Arch. Pediat.*, 1915, xxxii, 801) find that the method of vaginal washing in the smear diagnosis of gonococcus vaginitis has its greatest value in the diagnosis of chronic cases and cases under treatment. In these cases the secretions are likely to be scanty, especially about the vulva and vaginal introitus, whereas considerable amounts may be present in the vaginal canal and about the cervix. In vaginal washing these secretions are secured and this explains the success of the method.

Diagnosis by means of vaginal washing is, however, frequently difficult, and in all cases where the discharge is free direct vaginal and cervical smears are to be preferred.

Vaginal washings usually disclose a higher percentage of pus cells in vaginitis than simple smears, and these alone aid greatly in diagnosis.

In subacute and chronic vulvovaginitis with scanty discharge vaginal washings will disclose gonococci in from 20 to 25 per cent. of cases when direct smears are negative; the percentage of positive findings is increased after irritation of the vaginal mucosa with silver nitrate after the method of Norris.

The absence of gonococci in vaginal washings gives greater assurance of the absence of gonococcus infection and treatment guided by these examinations is likely to be more thorough, although greatly prolonged.

Anteversion of the Neck of the Femur.—Study of failures in the treatment of congenital dislocation of the hip has convinced R. A. Hibbs (*Jour. A. M. A.*, 1915, lxx, 1801) that some of these were due to anteversion deformity of the head and neck of the femur which was not recognized before operation.

There is a certain amount of anteversion in the normal femur, but probably not more than from 10 to 15 deg. More than this amount is abnormal, and certainly when it is as much as from 75 to 90 deg., grossly so. With the leg straight and the toe and patella pointing forward in the normal direction, the head of the femur cannot be completely in the acetabulum. With the head thus partially engaged in the socket, weight bearing is uncertain and there is always a limp. To treat the matter as a twist of the shaft of the femur, and correct it by osteotomy before any attempt is made to reduce the dislocation has been done in a series of twenty-nine hips in twenty-six children, all the patients having been previously operated on for dislocation once and in some instances twice, with failure. It is done by an osteotomy at the lower third of the femur. After the bone is divided, the lower fragment is twisted outward to the degree that the head is abnormally anteverted. After the bone unites, the patient is allowed to walk from eight to ten weeks until the external rotation of the leg is corrected by exercises and it takes the normal position in walking, the patella and toe pointing forward. At this point in the treatment the dislocation should be reduced.

Duodenal Ulcer in Infancy an Infectious Disease.—L. Gerdine and H. F. Helmholz (*Amer. Jour. Dis. Child.*, 1915, x, 397) state that Rosenow has conclusively established the fact that gastric and duodenal ulcers of the adult are the result of an infection with a streptococcus of particular virulence. That this holds good for duodenal ulcers of the infant also is shown by the following facts summarizing the work of Gerdine and Helmholz:

1. The appearance of duodenal ulcer in epidemic form.
2. The presence of diplococci and streptococci in all eight ulcers of the present series available for study, and in ten out of fourteen ulcers of a previous series of cases.
3. The isolation, at necropsy, from one ulcer, of a *Streptococcus viridans* which when injected into dogs and rabbits localized in the pyloric end of the stomach and the duodenum and produced there hemorrhages and ulcers.

Oxalic Acid Excretion in the Urine of Children.—J. P. Sedgwick (*Amer. Jour. Dis. Child.*, 1915, x, 414) says that the older methods of determination of oxalic acid are tedious and imperfect. The Albahary method gives better results and is much more rapid. He finds that new-born infants excrete oxalic acid in the urine in varying amounts up to 9 mg. per day.

Older children excrete oxalic acid in considerable quantity, and one child, fed on rhubarb, showed a definite increase in oxalic acid excretion during the period of rhubarb feeding.

If we accept the usual figures which are given for the oxalic acid excretion in adults, given by Neuberg as from 15 to 20 mg., the excretion in children is relatively and at times absolutely higher.

Phthalein Test in Orthostatic Albuminuria.—Renal function, as measured by the phenolsulphonephthalein test, in children with marked degrees of orthostatic albuminuria, is normal when the patients are at rest in bed. When these patients are placed in a position of accentuated lordosis, producing a marked albuminuria, the total output of phthalein in two hours is reduced—in T. C. Hempelmann's (*Amer. Jour. Dis. Child.*, 1915, x, 422) seven cases, on an average 12.9 per cent. The most marked feature, however, is the retardation which takes place in the output during the first hour—the average of his cases being 17.6 per cent. less in the lordotic position. Normal children do not show this retardation and decreased elimination with the change of posture. If this retardation may be brought into relation with any of the theoretical ideas of the pathogenesis of orthostatic albuminuria, it would probably be that which associates the condition with a decreased vascular supply to the kidney as the result of posture.

The Ammoniacal Diaper in Infants and Young Children.—According to J. Zahorsky (*Amer. Jour. Dis. Child.*, 1915, x, 436) if much ammonia is present, severe irritation and vesication of the diaper region may occur.

The ammonia is derived from the ammonium compounds in the urine, and is liberated by an alkali present in the diaper—soap, lye, lime, or stool.

When the diaper, which has been washed in a strong alkaline soap, is not thoroughly rinsed in clear water, sufficient alkalinity remains in the cloth to decompose the ammonia in the urine. This is the origin of the "common" saying that strong soap or lye in the diaper blisters the baby. It is not the alkali or soap on the skin, but the ammonia produced, which causes the skin irritation. An alkaline stool mixed with urine acts the same way, and we have often attributed an intertrigo to irritating feces, when it was really caused by ammonia.

Amebic Infection in the Mouths of Children.—In the examination of 1678 children A. W. Williams, A. I. Von Sholly, C. Rosenberg and A. G. Mann (*Jour. A. M. A.*, 1915, lxx, 2070) have found that amebas are demonstrated irregularly in all mouths once showing them, most constantly and in largest numbers in mouths showing gingivitis, least so in healthy mouths.

With ordinary teeth cleansing methods, the number of mouths showing amebas is reduced one-half. With emetin in the tooth wash, the number showing amebas is greatly reduced, only about 10 per cent. showing them. The second set of controls—those doing their cleaning at home by ordinary methods—continue to show amebas in about 75 per cent. of the cases.

The question as to the amount of emetin to be used has not yet been settled. The writers began with a 1:200 solution, then reduced it to a 1:400 strength. Probably a much smaller amount would be sufficient to keep down the development of the amebas.

Bladder Tumors in the Young.—R. F. O'Neal (*Bost. Med. and Surg. Jour.*, 1915, clxxiii, 873) says that vesical tumors in children are a very great rarity. The great majority appear before the fifth year. They are of the connective tissue type and are clinically and pathologically malignant except in rare instances. Difficulties of micturition are generally the earliest symptom; in the absence of stricture they should excite suspicion. Straining is common. Early diagnosis and operation offer the only hope of recovery.

Blood Coagulation in Infancy.—Dale and Laidlaw and others have found the coagulation time in healthy adults by this method to vary between one and thirty-nine seconds and one minute and fifty-one seconds. H. L. K. Shaw and F. J. Williams (*Alb. Med. Ann.*, 1915, xxxvi, 571) made examinations in 108 healthy infants under two years of age by the Dale and Laidlaw method and found the determinations were between one minute and fifteen seconds and one minute and forty-eight seconds, and the average coagulation time was one minute and thirty seconds which is a slightly shorter time than in adults. Sladen and Emerson, using the coagulometer of Russell and Brodie as modified by Boggs, found the average coagulation time in healthy adults to be five minutes, six seconds. The writers' results with this instrument gave a much lower average in infants, as follows: Ninety-five examinations in infants under one year of age averaged three minutes, forty-seven seconds; thirty-five between one and two years of age, three minutes, fifty-four seconds; and twenty between two and three years, three minutes, fifty-eight seconds. They observed no difference in the clotting time before and after eating, nor at different periods of the day. There was no difference in blood taken from various parts of the body—ears, fingers or toes. The first drop clotted somewhat more quickly than succeeding ones and a slight hastening of the coagulation time was noted when the tissues surrounding the needle prick were squeezed and manipulated to force out the blood.

Relation of Heat to Summer Diarrheas of Infants.—The studies reported in A. Bleyer's (*Jour. A. M. A.*, 1915, lxxv, 2161) paper show, in a series of 222 dispensary infants which developed acute attacks of diarrhea, that there was a direct relation between the degree of temperature and the onset of the diarrhea, over half (51.4 per cent.) of the babies becoming ill on days when the temperature was 90, although there were but 31 per cent. of such days in the two summers. The observations were made among babies of the poor among whom diarrheas in summer are very prone to occur. Most of them were rationally fed, usually on some mixture of certified milk when breast milk was not available. Thirty of them (13 per cent.) were exclusively breast-fed, and twenty-two more were partially breast-fed, which is evidence that heat may very well influence the baby who is taking clean food.

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ORIGINAL COMMUNICATIONS.

ACIDOSIS IN NORMAL UTERINE PREGNANCIES.*

BY

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THE interest of this clinic during the past twelve months has been concentrated largely upon the study of toxemias of pregnancy. Desiring to obtain data on the frequency of acidosis in normal uterine pregnancies, we have inaugurated at the suggestion of Dr. Lynch the study in our clinic of a series of unselected normal pregnancies. Since we have included in our investigation all cases who thought themselves pregnant, we have observed several very early pregnancies as well as some few cases who thought themselves pregnant, but who were found not to be so. When this work was begun, it was my intention to study several hundred cases before reporting the findings, but the results have been so striking that it seems well worth while to briefly discuss the sixty-eight cases thus far investigated. This report is preliminary and is designed only to establish the fact that acidosis is nearly uniformly present in uterine pregnancies.

Ever since the days of Pflüger, attempts have been made to connect acidosis with toxemias of pregnancy. Theoretically, there are at least four methods for the investigation of such an acidosis.

(1) By study of CO_2 in expired air.

(2) By investigation of the changes in the CO_2 -tension of the plasma of the blood.

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(3) By study of the hydrogen-ion content of blood and urine.

(4) By estimation of the ammonia content of the urine.

Nearly all these methods have had their advocates. Yet, as a rule, results which have been recorded are subject to some criticism because of defects in the method. There has been no series of striking results save those of Hasselbalch and Gammeltoft, who studied the blood of nine cases before and after labor, finding an acidosis before labor which disappeared thereafter. They observed an increase in ammonia in the urine and decrease in the acidity of the urine in all of the normal cases and in two of four eclamptics investigated in this manner. The two remaining eclamptics gave no evidence of this compensatory change in the urine.

As a rule, the better methods for the investigation of an acidosis have been either too cumbersome for routine work or are attended with considerable expense. Fortunately for us, Van Slyke(1), in 1915, reported an ingenious, simple and inexpensive method of determining the CO_2 which is chemically bound in the plasma. The method is available for the average laboratory worker who is trained in chemical methods. We refer the reader to Van Slyke's report for his technic. We have followed accurately these directions in our investigation save that we have substituted two drops of amyl alcohol for the octyl alcohol which has been recommended, since this latter substance has proven most difficult to obtain. The method is made more simple because of a table which has been compiled by Van Slyke and which obviates the necessity of calculating the CO_2 bound as carbonate in the blood plasma in terms of volume percentage. Van Slyke states that the plasma of normal adults yields from 0.65 to 0.90 c.c. of gas, an equivalent of a range of 53 to 77 volume per cent. of CO_2 so chemically bound.

In order to present a clear picture, we have arranged the findings of the entire group of sixty-eight cases investigated in Tables I and II, grouping them according to the percentage of the CO_2 tension. We have noted, also, in Table I, the lunar week of pregnancy in which the plasma was examined, the presence and duration of nausea and vomiting, the age of the patient, and the number of previous pregnancies, including abortions and premature labors. In Table II we group those cases which were found not to be pregnant, with the exception of a case of extrauterine pregnancy. Table IV presents cases in which more than one estimation was made during pregnancy.

Fifty-five of the sixty-one cases of Table I show readings below 50 volume per cent. which is approximately the lowest reading noted in any of our nonpregnant cases. Fifty-five cases, then, of the sixty-

one pregnancies show an acidosis. Putting it the other way, 90 per cent. of this series show an appreciable decrease in CO_2 -tension as compared with the normal, taking 50 as the normal volume per cent. and considering Nos. 56 and 57 as 50. Yet fifty-nine of these sixty-one cases fall below the volume per cent. of 53, which Van Slyke takes as the lower limit of normal. An acidosis of varying degree, therefore, was found in nearly all cases.

The variations in the percentages of CO_2 -tension are frequently most striking and we early attempted to determine the law which governed them. Consequently, we grouped our cases in various ways: thus, according to the number of gestations, the weeks of the present pregnancy, the age of the patient and the amount of nausea and vomiting either present or experienced in the present pregnancy, hoping to find some uniformity in CO_2 -tension. But no uniformity was found in any grouping. For instance, when we compared the cases according to the number of gestations, we found that a woman who had seven pregnancies had about the same CO_2 -tension as a woman in her first, the reading being made at the same period of the present pregnancy (see Nos. 8 and 9 on Table I). Neither do the weeks of pregnancy furnish any clue. Moreover, we find that a case in the first eighteen or twenty weeks of pregnancy may present readings identical with those of the last weeks of pregnancy. Since starvation will produce acidosis, it seemed necessary to study separately the cases who had nausea and vomiting. Yet nothing noteworthy was determined. Wide variations may exist in the blood readings of these cases. Since the cases were unselected, we were not acquainted with accurate details of diet. Yet there was no case in which starvation would be considered at the time of the first blood reading. One patient starved herself later (see No. 43 on Table IV). She showed a decided drop in CO_2 -tension when seen at this time.

Only one of the nonpregnant women (No. 62) was below 50.00. The blood plasma was read again two weeks later when it showed a CO_2 -tension of 55.75 volume per cent. The first blood examination was made a few hours before the onset of menstruation and when she was two or three days overdue. We have no other such case in our series and it opens up many interesting points of speculation as to the influence of menstruation on the CO_2 -tension of the blood. These, unfortunately, must be repressed until we have had many other similar cases. No. 63 was a ruptured tubal pregnancy. In this class of cases, also, we require more studies before drawing conclusions.

There are, then, only two of the sixty-one cases of pregnancy of

our series which did not show a decrease in CO_2 -tension. One of these, No. 61, was a chronic alcoholic and gave birth to a seven months' macerated fetus twenty-six days after she was seen first and two weeks previous to her estimated date of confinement. Our tables justify our statement that we may expect to find a decrease in CO_2 -tension in the great majority of the cases of uterine pregnancy.

We have investigated the blood plasma of twenty-five of these sixty-one uterine pregnancies after delivery (Table III). Nineteen of these, or all save six, regained the normal or at least rose above 50. Only one case of the six (No. 23) dropped from 42.20 to 41.40. This patient had given evidence of a mild chronic interstitial nephritis, with a recrudescence in the puerperium. The remaining five showed gains varying from 2.20 to 13.60 volume per cent., even though they did not return to normal. Only one blood examination for each case was made during the puerperium, so we do not know the exact time at which any case regained normal level. No. 60 was above normal before delivery and remained so after. Yet wide variations are seen in readings of various cases made on the same day postpartum (Case II and XXII, Table III, IV, V and XV, etc.). The most striking feature of Table III is seen on comparing the cases below 40 and above 40 before delivery. Those below 40 show a much more decided increase in CO_2 -tension after delivery.

Blood readings were made more than once on three of our patients before delivery (Table IV). No. 7, who showed a slight increase (from 38.50 to 39.60), was under treatment for lues at time of her second plasma examination. No. 43 had been on very scant diet for several days before her second reading. She was vomiting quite frequently, but, most unfortunately, did not care to accept any treatment which did not contemplate abortion and thus passed from observation. No. 48, on her first visit, was thought to have a beginning nephritis. There were no evidences of this on her second examination, when the CO_2 -tension had risen from 46.00 to 48.90. Later, she gave evidence of preeclamptic toxemia, when labor was induced in consequence. Her plasma then showed 40.20 volume per cent., a decided drop from the previous readings. We are making no conclusions from this case, because this last reading was made during labor. We have examined only two normal cases during labor, and these also gave low CO_2 -tension (Nos. 4 and 5 of Table I). Until further investigations have been made of the effect of labor on the CO_2 -tension, we could not say whether this drop was due to the toxemia or to the strain of labor.

TABLE I.

No.	C.c. of CO ₂ chem. bound by 100 c.c. plasma	Weeks of pregnancy	Nausea and vomit- ing in present pregnancy	Age	No. of gestations
1	31.00	36	None.	21	II
2	31.60	37	None.	32	II
3	36.20	26	None.	24	II
4	37.40	During labor	1½ months.	20	II
5	37.50	During labor	3 months.	38	IV
6	38.20	36	None.	23	II
7	38.50	29	3 months.	23	I
8	38.50	32	None.	21	VII
9	38.70	34	None.	27	I
10	40.20	35	None.	23	II
11	40.35	35	3 months.	20	I
12	40.40	34	None.	28	I
13	40.40	10	2½ months.	34	IX
14	40.50	19	2 months.	41	V
15	40.60	35	None.	24	III
16	40.80	8	2 months.	21	IV
17	40.80	34	1 month.	19	I
18	41.20	17	None.	25	IV
19	41.40	16	None.	32	IV
20	41.60	35	3 months.	30	IV
21	41.80	5	4 days.	18	I
22	41.80	39	3 months.	21	II
23	42.20	40	None.	21	III
24	42.20	20	None.	33	II
25	42.20	30	2 months.	31	I
26	42.20	22	None.	35	III
27	42.30	32	2 months.	22	II
28	42.35	33	None.	27	I
29	42.40	30	None.	37	V
30	42.75	37	4 months.	25	I
31	43.00	36	None.	40	VI
32	43.00	39	3 months.	19	I
33	43.30	27	Once.	15	I
34	43.30	8	2 months.	25	III
35	44.00	33	None.	35	III
36	44.00	39	None.	30	VIII
37	44.20	19	1 month.	36	II
38	44.30	10	None.	22	I
39	44.30	11	None.	19	I
40	44.45	33	None.	30	III
41	44.45	35	None.	30	VIII
42	45.10	22	None.	21	I
43	45.20	10	2½ months.	34	III
44	45.20	14	1 week.	22	I
45	45.30	38	2 months.	18	I

TABLE I.—(Continued).

No.	C.c. of CO ₂ chem. bound by 100 c.c. plasma	Weeks of pregnancy	Nausea and vomit- ing in present pregnancy	Age	No. of gestations
46	45.90	40	None.	24	IV
47	46.00	32	3 months.	20	IV
48	46.00	29	3 weeks.	23	III
49	46.20	38	None.	39	IX
50	47.05	27	None.	41	VI
51	47.90	23	1 month.	24	IV
52	47.90	27	3 months.	20	I
53	48.15	38	4 months.	27	III
54	48.85	29	4 months.	23	III
55	49.00	39	3 months.	23	III
56	49.85	29	2 months.	30	I
57	49.85	35	None.	27	IV
58	50.00	37	None.	26	I
59	52.85	6	Marked.	28	V
60	58.50	31	1 month.	20	III
61	59.40	35	Chronic alcoholic- macerated fetus of seven months.	39	IX

TABLE II.

No.	C.c. of CO ₂ chem. bound by 100 c.c. of plasma	Remarks
62	48.85	Not pregnant—menstruated few hours after test.
63	49.00	Ruptured tubal pregnancy—two months.
64	50.00	Not pregnant.
65	53.85	Not pregnant.
66	51.90	Not pregnant—tuboovarian mass.
67	57.65	Not pregnant.
68	59.50	Not pregnant—pus tube.

Four of the patients who were found not pregnant were reexamined within two months of their first visit. While all showed a slight variation in volume per cent. of CO₂ as compared to their first reading, they all stayed well above 50.00.

Our findings from the study of CO₂-tension of the plasma show, then, that an acidosis is present in the great majority of uterine pregnancies. If acidosis occurs, in the so-called normal phenomena of life, must we not hesitate in drawing conclusions as to its significance in pathological conditions? We surely must demonstrate that an acidosis is not present in the normal pregnancy before we attempt to demonstrate its rôle in the various toxemias. It seems

TABLE III.

No.	CO ₂ chem. bound by 100 c.c. plasma	Weeks of pregnancy	CO ₂ chem. bound by 100 c.c. plasma	Days after delivery	Difference
2	31.60	37	45.20	7	13.60
4	37.40	40	67.15	8	29.75
5	37.50	40	51.75	8	14.25
6	38.20	36	59.50	58	21.30
8	38.50	32	51.50	2	13.00
10	40.20	35	57.65	31	17.45
11	40.35	35	57.65	13	17.30
15	40.60	35	55.65	8	15.05
20	41.60	35	51.00	37	9.40
22	41.80	39	51.90	7	10.10
23	42.20	40	41.40	2	0.80
26	42.20	22	47.10	4	4.90
28	42.35	33	52.90	10	10.55
29	42.40	30	53.00	11	10.60
30	42.75	37	48.90	2	6.15
31	43.00	36	53.70	3	10.70
32	43.00	39	55.70	5	12.70
36	44.00	39	48.10	10	4.10
41	44.45	35	52.80	31	8.35
45	45.30	38	55.70	40	10.40
46	45.90	40	48.10	13	2.20
49	46.20	38	55.75	33	9.55
53	48.15	38	55.80	10	7.65
55	49.00	30	49.90	4	0.90
60	58.50	31	56.75	2	1.75

TABLE IV.

No.	CO ₂	Week of pregnancy	CO ₂	Week of pregnancy	CO ₂	Week of pregnancy	Remarks
7	38.50	29	39.60	38	.....	.....	Has xxx positive Wassermann.
43	45.20	10	35.60	13	.....	.....	Developed pernicious nausea and vomiting.
48	46.00	29	48.90	32	40.20	In labor	Developed severe postpartum eclampsia with subsequent symptoms of dementia precox.

quite likely to me, moreover, that this method may prove useful as an adjunct in the diagnosis of early pregnancy provided, of course, that other conditions causing enlarged uteri do not cause similar disturbances of plasma.

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IS THE OPERATION OF CESAREAN SECTION INDICATED IN THE DELIVERY OF BREECH PRESENTATION?*

BY

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A WELL-KNOWN teacher of obstetrics once remarked in the writer's hearing, that if he were asked how to determine the capability of an obstetrician, he would like to be present and watch the operator's method of conducting a breech presentation and delivery; and that he would be willing to let his opinion of the physician's skill as an accoucheur rest on the manner in which the case was treated. This may sound rather like a radical statement, but after thoughtful reflection upon the complication under consideration, it does not seem that such a judgment would be entirely unwarranted.

An abnormality which occurs in 3 to 4 per cent. of all labors, with a fetal mortality estimated by various authors as from 10 to 30 per cent. certainly merits more than superficial thought, and if with our present recognized modes of delivery such an extreme fetal mortality *really* does result, it would seem that we should look somewhat further afield, and attempt to discover and carefully consider some other method which will yield more living children, always provided that the maternal risk is not increased thereby.

With the idea of trying to discover what the actual figures would be in a large number of cases, the writer has attempted to analyze 3412 cases of breech presentation and delivery which have occurred in 97,000 confinements, all in the service of the New York Lying-In Hospital from its inception to September, 1915. An earnest effort has been made to include in the fetal mortality only those cases in

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which the cause of the stillbirth could be directly attributed to the breech delivery. Such causes as *prematurity*, *placenta previa*, *toxemia of pregnancy*, *deformed pelvis*, *abdominal* and *pelvic tumors* while noted, have been eliminated, as it is impossible, if these complications are included, to determine what proportion of the stillbirths was caused by the existence of the abnormal presentation with the subsequent abnormal labor, and what proportion was due to the complication. Such an elimination in the same way, and for the same reason is necessary in order to determine the maternal mortality in breech presentation and delivery, and it is most essential to have an absolutely clear view of the maternal death rate, in order to compare it with that of any other operative procedure which we may wish to substitute for the recognized methods of delivery in this complication.

The actual etiology of breech presentation is not entirely clear, it being stated that gravity, flaccid uterine and abdominal walls, impediments to the engagement of the head, etc., etc., all play a large part. Williams(1) believes that in primiparæ, particularly, the existence of a breech presentation always means some disproportion between the fetus and pelvis or the fetus and the uterine cavity. He states, however, that "there will still remain, in spite of the most careful examination, a large number of cases in which no definite disproportion between the fetus and pelvis can be demonstrated before delivery."

There would, therefore, seem to be considerable doubt as to the cause of breech presentation, and the fact of universal disproportion in primiparæ does not seem to the writer to have been proved.

The frequency of the abnormality under discussion in Pinard's series taken from 100,000 labors was 3.3 per cent., in our series the complication occurred in 97,000 cases 3412 times, or 3.5 per cent. or in 2.3 per cent. of cases reaching term. Pinard states that 59 per cent. of all cases occurred in multiparæ. In our series 72.3 per cent. occurred in multiparæ or approximately three times as many as in primiparæ.

In contradistinction to these figures are those of DeNormandie(2), based on a much smaller series it is true, who found that breech presentation occurred in primiparæ in 57.2 per cent. of his cases at the Boston Lying-In Hospital.

So far as prognosis for the mother is concerned, the maternal mortality does not, and should not, differ greatly from that of vertex presentation in uncomplicated cases. The maternal mortality in our series, including cases complicated by convulsive toxemia

(eclampsia), of which there were thirty-seven; placenta previa, of which there were sixty-three; chronic nephritis, chronic endocarditis, pneumonia, etc., all of which have a mortality of their own, was 0.96 per cent. Excluding these complications, the mortality was found to be 0.47 per cent., which is not excessive, when it is considered that many of these cases had been handled by outside physicians and midwives.

Coming to the prognosis for the child, however, here we find a much higher mortality than in vertex presentation. The fetal mortality is generally estimated by various authors at from 10 to 30 per cent. In our series of the 3412 cases of breech presentation, 336 children *at term* were stillborn, a mortality of 9.4 per cent. 422 were premature, and would in all probability not have survived in any event. We are, therefore, concerned with the treatment of a complication, as a result of which 9.5 per cent. of the children are stillborn.

Regarding the parity of the mothers, 944 were primiparæ; 2468 were multiparæ.

Regarding the fetus, there were 198 stillbirths in the 944 primiparæ; and 560 stillbirths in the 2468 multiparæ, a percentage of 21.6 per cent., and 22.7 per cent., respectively. In other words, the difference in mortality in the children between primiparæ and multiparæ was so small as not to be considered.

Broadly speaking then, the operative choice of a means of delivery in breech presentation lies between the usual method by the vaginal route, or by the means of an abdominal hysterotomy, which latterly seems to be the panacea for all obstetrical ills and malpositions.

Williams of Boston(3), in an article entitled "Cesarean Section for Primiparous Breech Presentation," frankly expresses himself in his concluding paragraph as being committed to the abdominal hysterotomy for a breech presentation in the majority of cases, and quotes the history of two cases in which he performed the operation with favorable outcome for both mother and child.

It is unfortunate for the subject in hand that these two patients showed exactly what they did, for in the first one, while it is true that the fetus presented by the breech, the patient in addition had a submucous fibroid; this prevented the descent of the presenting part and would have been just as great a bar to a fetus presenting by the vertex. According to the measurements given, the pelvis was large, the baby of moderate size ($7\frac{1}{2}$ pounds), and the abdominal hysterotomy in the last analysis was done, not for breech presentation, but for fibroid. The second case above referred to showed a $9\frac{1}{2}$ -pound baby, and a pelvis with a true conjugate of 10 cm. with the

external measurements very slightly contracted, and Williams takes the ground that owing to the fact that the breech was not engaged an abdominal Cesarean section was indicated, which he successfully performed. This argument presupposes that a 9½-pound breech cannot be delivered through a pelvis which is practically normal, a statement which the writer is strongly inclined to doubt.

Let it be understood that we are far from believing that there will not occasionally be a patient, either multipara or primipara, in whom there will be a disproportion between the size of the child and the mother, in breech as well as in vertex presentations, and in whom an abdominal Cesarean section is indicated in order to save the life of the child; nevertheless, there is a definite maternal mortality to Cesarean section, even in the best and most conservative hands, of from 2 to 4 per cent. which compares very unfavorably with 0.47 per cent., to say nothing of the danger of rupture of the uterine scar in subsequent pregnancies, which Findley(4), in a recent article, estimates as at least 2 per cent. and it is the writer's earnest belief that at the present time too free a use of abdominal hysterotomy is being advocated.

He is far from being overconservative in regard to this operation as two papers previously presented before this association will attest, but at the present time he is fully convinced that a careful observance of the customary technic in delivery, interference when progress is not satisfactory, noninterference when progress is certain, even if slow, postural treatment, waiting until the breech appears at the vulvar orifice before attempting to deliver, proper understanding of the technic of extraction of the arms and after-coming head, particularly the latter, with regard to downward traction, warm towels around the body of the child, and care and deliberation with regard to the maternal soft parts, all as laid down in any good text-book, will result in an even lower mortality for the child, than at present, and in many more living mothers, than by what he is forced to believe a too radical and rarely necessary operation, namely, abdominal Cesarean section for the condition under consideration.

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- 20 WEST FIFTIETH STREET.

THE INTERPOSITION OPERATION OF WATKINS-
WERTHEIM. IN THE TREATMENT OF
CYSTOCELE AND PROLAPSUS
UTERI.*

BY

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ONE bane of those who do any gynecological surgery has been the patient with a large cystocele and a descensus uteri or an hypertrophic elongation of the cervix. Learning my lesson early in my experience with this class of cases, I had for a long time felt very loath indeed to urge such cases to operation by any of the procedures which I was then following. I could not bring myself during this period to the point of promising my patients any relief.

In the mild cases of slight cystocele with descensus, the operation of Stoltz, Emmett, and of Martin, with an accompanying perineorrhaphy, sufficed in most instances to give relief, but in the more severe cases we soon learned that these operations did not at all answer the purpose. Nor in this latter type of case did the operations originated by Gilliam and others before him, which shortened the round ligaments, suspended or fixed the uterus by one or the other of the various methods in use, improve conditions one whit. In spite of these additional operations, the cystocele and descensus always returned.

I tried many years ago, as the result of my failures, to overcome the cystocele by transplantation of the bladder high up on the uterus working through an abdominal incision. I was not successful because I could not hold the uterus up, and I had not the ingenuity to devise, through the abdominal incision, any method which would interpose the uterus between the bladder and vagina as is done in the method under discussion. Five years ago, when in spite of my skepticism but forced by my poor results, I undertook, upon some of my patients, the operation devised by Dr. Watkins, I was astounded at the brilliant cures I obtained. Since that time we have done about an average of twenty to twenty-five of these cases every year, having done twenty-two of them within the current year, and in our

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series we have not had a single complete failure, though there is one patient who still has some slight disturbance. Probably in this individual case a different operation should have been done.

This latter case was in a woman some eight or ten years past the menopause, with a very small uterus, and I believed at the time that the procedure devised and advocated by Mayo under such circumstances should probably have been done. As it is, this patient now has a very slight bulging of the bladder, just enough to prevent its complete evacuation and to maintain a slight cystocele, she having had previous to her operation a most marked and troublesome infection of the bladder due to urinary retention and decomposition. With this, and one other exception, we have had only the most gratifying results in our practice, and we have been able to follow every one of our private cases.

On account of imperfect indexing and tabulation in our early cases we are not able to give our exact number, but I am sure that the figures given above do not exaggerate the number. Some of our operations have been done in our public hospital service and of these, which is the second exception, there is one death to report which resulted from a septic infection. Other than these two cases, we have had no untoward results, and if we exclude occasional superficial stitch infections, there have been no complications nor disturbances of any kind.

The difficulties in the surgical treatment of large cystocele with prolapse are evidenced by the great number of procedures that have been advised and practised for the rectification of this condition. I think that previous to the development and perfection of the Watkins-Wertheim operation, as I have said before, there was no method of which I have cognizance to deal successfully with these unfortunate patients. I have been astonished that so little notice has been taken of this most valuable addition to our planned operations by the various text-books, and that this method has been so neglected by the teaching staff over the country.

I was very much surprised in going over Dr. Watkins' writings to find that he had been doing this operation for such a long time, and that it was given to the profession as early as 1898. This, of course, does not speak well for my study of the literature, but be that as it may, it had escaped my notice until within recent years. It may be that I had practised so many of the different and numerous methods which had been devised and approved, with such uniformly bad results, that I did not attach sufficient importance to Dr. Watkins' publication, and that it did not impress me deeply enough.

I feel that we probably have had an imperfect understanding of the nature and extent of the anatomical defects and structural changes which have existed, and that we have also failed to appreciate the changes in anatomical relationship and the advantages incident thereto which are brought about by this operation. We have attempted to cure a true hernia of the bladder by simply infolding it and covering it over with mucous membranes. Any plan based upon the same principles would be ridiculed if applied to hernia of the gut through any of the potential canals in the body. We have also failed to vary our plan of relief in the individual case and have applied (and still do I think) the same method to practically every case. We must certainly do as Watkins and Mayo have done and group these cases in at least three different classes, modifying our plan in each class. In the child-bearing woman the modification suggested by the originator of the operation has given the best results in my own hands, though we have varied this somewhat by making a lower bladder attachment to the fundus of the uterus and attached the vagina to a lower point upon the anterior wall of the uterus.

In the elderly woman, with the very small atrophic uterus, we believe that the plan suggested by Mayo, which we have carried out a number of times, is the one to be preferred. With the small uterus removed, the broad and round ligaments form a magnificent floor for the bladder, and if the superior portion of the broad ligaments be then sutured to the most anterior point of the vagina and this line of suturing followed down to the base of the ligaments, including the round ligaments in this suture, we have not only an excellent and very superior support for the bladder but also a strong ligamentous support for the vagina itself. The subsequent recurrence of a cystocele, or the subsequent occurrence of an intestinal hernia through the vagina with a coincident prolapse or inversion of the vagina, is neither to be anticipated nor to be feared. We have seen a number of cases where hysterectomy has been done for the cure of cystocele with prolapse, the broad ligaments having been sutured merely into the vault of the vagina and in each one that we have seen there has been not only no improvement of the cystocele but a much worse complication. In the presence of such recurrent conditions it is often a most difficult matter to give these individuals relief by any subsequent operations. Hysterectomy alone without proper vaginoplastics never cured a prolapsus or cystocele, but, on the contrary, as indicated, only makes bad matters worse.

The technic of the operation is doubtless familiar to the Fellows, but to make the paper complete we offer the following very brief description as laid down by the originator of the method.

The patient is prepared in the usual manner, and after being anesthetized (nitrous oxide gas and oxygen) is placed in the lithotomy position. The anterior cervical lip is grasped with volsellum forceps, the anterior vaginal wall separated from uterus through a semilunar incision circumscribing the anterior cervix. The anterior vaginal wall from the cervix to within an inch of the meatus urina-rius is then incised in the median line, care being taken to avoid injuring the bladder. With scissors or by blunt gauze dissection the bladder is separated from the vagina extending well out laterally so as to free the entire cystocele, now the uterovesical fold of peritoneum easily recognized as a freely movable layer between the bladder and uterine body, is opened. The peritoneum may be perforated with the finger or grasped with forceps and incised, the opening then dilated sufficiently to permit delivery of the uterus. The uterus is delivered into the vaginal canal by passing the finger over the fundus or broad ligament, or by grasping the fundus with bullet forceps. The anterior wall of the uterus should not be grasped and an attempted delivery through the peritoneal opening made as the diameters of this segment are greater than the fundus and difficulty will ensue. Delivery of the fundus first is easy and presents no trouble. The uterus having been delivered, a suture is now introduced through the vaginal flap near the urethra, then through the uterine body behind the fundus and through the opposite flap at a point corresponding to that of its introduction on the opposite side. The fundus should be drawn sufficiently downward to support the prolapsed bladder wall, but not to press upon the urethra and thus interfere with micturition. This first suture is then tied and the required number of others inserted parallel thereto. The remaining portion of the wound is then closed. Where the cystocele is very large some of the redundant vaginal flap may be excised.

The principles of the operation, as explained by Watkins, are: (1) The bladder is supported by and rests upon the posterior wall of the uterus. (2) The uterus is elevated in the pelvis by being tipped forward, in fact, its position is changed about 180 degrees. The twist in the broad ligaments produced by the changed position of the uterus perceptibly shortens them. (3) The tendency for the uterus and bladder to prolapse following the operation are antagonistic, as any sagging of the bladder increases the anterior displacement of the uterus, and any prolapse of the uterus elevates the bladder wall.

In the completed operation the bladder rests upon the posterior wall of the uterus.

So far as can be ascertained, the only objections which have been urged against the Watkins-Wertheim operation are: (1) Its employment is contraindicated, without certain modifications, during the child-bearing period because of complications which might arise during pregnancy and parturition. This objection, however, seems unimportant since extensive uterine prolapse and cystocele usually occur most frequently after the menopause. (2) The difficult technic incident thereto. This objection also seems untenable as the technic is not as difficult as that incident to other operations sufficiently radical to offer permanent correction of extensive prolapse.

Even in complete uterine prolapse, if the uterus be not seriously diseased, a modified Watkins-Wertheim operation seems preferable to hysterectomy, as the uterus affords ideal support for the prolapsed bladder. "This modification is made by severing a portion of the base of each broad ligament from the cervix and by suture of the free ends of the broad ligaments together in front of the cervix" (Watkins).

In conclusion, we would urge a much wider adoption of this operation, and particularly by those of the Fellows of this Society who have not as yet tried it, if there be such. We would also urge that some effort be made to bring this most excellent procedure for the relief of a most distressing condition to the attention of text-book writers and thus have it placed more generally before the coming generation of surgeons. In our opinion, this operation should be upon just as firm and stable a foundation and should have the same standing as the operation of Bassini for the radical cure of inguinal hernia.

400 ATHERTON BUILDING.

CESAREAN SECTION AS THE OPERATION OF CHOICE IN DIFFICULT LABOR CASES.

BY

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THE modern tendency is constantly to widen the indications for Cesarean section, as the technic of the operation has been improved and its safety increased. It is no longer an operation reserved for the impossible pelvises or cases where the birth canal is blocked by

a tumor. One of the most important advances is its substitution for the dangerous axis-traction forceps. It is not justifiable to attempt by main force to drag a child's head into a contracted pelvic inlet; the dangers of this procedure to both mother and child should forbid it. Cesarean section is preferable also in cases of breech presentation, with a justominor pelvis or other type whose contraction averages 2 cm. or more, and where, because of the breech presentation, it is, of course, an impossibility to gauge the size of the head. In these patients, the head must come through the pelvis unmolded and unflexed, adding to the dangers. A prolapsed cord in a primipara, with partially dilated and partly effaced cervix, should cause serious consideration of Cesarean section, as giving the child a fair chance of survival. In placenta previa, especially in primiparæ, the field for Cesarean is constantly widening. Premature separation of a normally situated placenta, where the cervix is not dilated or effaced, often demands Cesarean section for the mother's safety, even though it be known that the child is dead.

These are the more important indications, other than impossible disproportion between child and pelvis, or obstruction by a tumor, and in all of them Cesarean section is certainly safer than an attempt to drag a child hurriedly through a birth canal, unprepared for the ordeal by the normal dilatation.

But to meet the different indications presented, more than one technic is necessary. At least five different methods, excluding the misnamed vaginal Cesarean section, are required. The five are as follows: 1. The old classical Cesarean, with the long incision and eventration of the uterus before opening it. 2. The more modern short incision, opening the uterus *in situ*, and then closing the uterine wound outside the abdomen. 3. One of the many varieties of extraperitoneal Cesarean section. 4. The Porro operation, sewing over the uterine cervical stump and dropping it. 5. The Porro operation, in which the stump is closed, and then marsupialized by fixing extraperitoneally in the lower angle of the abdominal wound and drained. These technics meet the indications presented, in a way impossible if only one method of performing the operation is used.

I. THE OLD CLASSICAL OPERATION.

This is the easiest and hence the best for the occasional or inexperienced operator. It has certain grave disadvantages: 1. The greater likelihood of hernia, in the very long wound. 2. The greater chance of adhesion of the uterine wound to the abdominal.

3. The greater chance of contamination of the peritoneal cavity, especially after the uterus is emptied and while the uterine wound is being closed.

It is one of the methods to be considered in a clean case, but is not a safe method in a case where contamination is suspected due to repeated examinations or futile attempts at delivery.

Technic.—1. The patient's skin is prepared as for any abdominal operation and in addition, the vagina is cleansed and packed with sterile gauze.

2. As soon as the operation is begun, the patient receives, by hypodermic, 2 ampules of aseptic ergot, and 1 ampule of pituitrin.

3. A long incision is made, extending from halfway between the umbilicus and xyphoid to near the symphysis, and the uterus delivered outside the abdominal cavity.

4. Large gauze pads, with tapes attached, are packed behind, to either side and in front of the uterus, to safeguard the peritoneal cavity from contamination.

5. An assistant, with both hands outspread, compresses the abdominal wall around the lower uterine segment. This is not to control hemorrhage, but to prevent blood and liquor amnii entering the peritoneal cavity. To compress the broad ligament to control bleeding is a mistake, as it tends to favor subsequent relaxation.

6. The uterus is incised in the middle line, anteriorly. The placenta, if exposed by the incision, is disregarded. The child is seized by one leg and delivered. The cord is clamped in two places and cut, the child being held meanwhile head downward. The child is then handed to an assistant to be revived, if needed, and the cord tied.

7. The placenta is delivered manually, and the membranes freed by gentle traction.

8. The first layer of sutures is begun by inserting a curved needle, threaded with a long strand No. 2 chromic catgut, through the uterine wall *above* the wound and emerging in the upper angle of the wound, just above the endometrium. The cut muscle is then closed in two layers, by a continuous tier stitch, care being taken not to penetrate the endometrium. When the upper angle of the wound is reached, in the return, the needle penetrates the wall and emerges above the wound, opposite the point of insertion; the stitch is then tied. Thus no knot is buried in the wound.

9. The peritoneal covering of the uterus is closed, by a continuous stitch of No. 2 chromic catgut, threaded on a straight needle, sewing from above downward, and on returning the needle is inserted

between the insertions made on the downward trip. This stitch also is tied *above* the uterine wound, the complete stitch appearing like a laced-up shoe.

10. The uterus is returned to the abdominal cavity; any clots are sponged out of the peritoneum (usually only a small amount, if any, near the bladder), and the abdominal wound closed and dressed in the ordinary way.

2. THE SAENGER OPERATION WITH THE SHORT HIGH INCISION.

This is the best operation for the unquestionably clean case; especially for operations of election.

It has the very great advantage of preventing the coincidence of the uterine and abdominal wounds, and therefore minimizing the dangers of adhesions. The short wound is much less likely to be the site of a hernia. It is slightly more difficult than the old classical operation. The only contraindication to it in a clean case would be a case of placenta previa, where it was vital to prevent all possible loss of blood during the operation, as here the broad ligament cannot be compressed while the uterus is being opened as in the case of the long incision. Otherwise it is by all odds the best operation for the clean case.

Technic.—1. The patient's abdomen and vagina are prepared as previously described, and the same dose of ergot and pituitrin is given when the operation is begun.

2. A short central incision is made, one-third above and two-thirds below the umbilicus, just long enough to permit the delivery of the head.

3. An assistant compresses the abdominal walls around the uterus, *in situ*, making greater pressure from the patient's right toward her left side. This is to overcome the normal lateral torsion of the uterus, and if it is not done, the uterine incision will be too near the left broad ligament, with considerably more hemorrhage.

4. The uterus is incised and the child delivered and treated as previously described.

5. As the head is being delivered, the assistant hooks his forefinger in the upper angle of the uterine wound, and pulls the uterus out of the abdomen, and then packs off with gauze behind and to either side.

6. The placenta and membranes are then delivered as previously described.

7. The uterine wound is closed exactly as in the previous operation,

the uterus returned to the peritoneal cavity, and all clots sponged out.

8. The abdominal wound is closed and dressed as usual.

3. THE EXTRAPERITONEAL CESAREAN SECTION.

It is well known that the chief danger of Cesarean section is the risk of peritonitis in the case which has been repeatedly examined and handled, before the operation is undertaken. The attempt to avoid this risk led to many ways of doing the operation extraperitoneally. Some twenty-five different methods have so far been devised. None of them are really extraperitoneal, if by this be meant that it is not possible for contamination of the peritoneum to occur during or after the operation. Most, if not all, however, reduce this danger to a minimum, and this is the most that can be claimed for them.

The ideal indication for the operation is the case which has been in labor for a considerable time, whose lower uterine segment is therefore well thinned out; who has been repeatedly examined; whose child is in good condition but who is *not* obviously infected; one whose previous aseptic management is open to suspicion, but not one where infection is a practical certainty.

It has certain disadvantages. 1. It is the most difficult technically, of all the Cesareans. 2. It is not to be attempted before the patient is in labor, as the lower uterine segment is not thinned out. 3. Above all, it is *not* the operation for placenta previa. This because of the excessive bleeding.

These objections apply more or less to all the methods of extraperitoneal Cesarean, but particularly to the one whose technic is here described.

Technic.—1. The patient's abdomen and vaginal canal are prepared as previously described, and the doses of ergot and pituitrin given.

2. A central incision is made, from 2 inches below the umbilicus to the symphysis.

3. The peritoneum of the lower uterine segment is split in the middle line and dissected down behind the bladder.

4. The parietal and visceral layers of peritoneum are then clamped or sewed together. The former is quicker, easier and satisfactory. This leaves an oval space of raw uterine muscle exposed.

5. A broad bladed retractor is then placed behind the bladder in the lower angle of the wound.

6. The lower uterine segment is opened in the middle line, and the child's head delivered through the wound, with forceps. During

the delivery of the head, the retractor is removed, as its presence increases the risk of a tear of the bladder. A breech presentation makes this step of the operation considerably easier.

7. The child is treated as in the previous operations.

8. The placenta is extracted manually, with its membranes.

9. The wound in the lower uterine segment is then closed with a two-tier continuous stitch of No. 2 chromic catgut. This stitch is a little more difficult of insertion than in the previous operations, but the difficulty is fairly easy to overcome.

10. The hemostats or stitches holding the two layers of peritoneum together are removed, and the peritoneum of the lower uterine segment sewed back where it belongs, over the uterine wound. No. 2 chromic gut is used.

11. The peritoneum is cleansed, and the abdominal wound closed as usual.

Due to the suture line in the lower uterine segment, which prevents it from collapsing as it does after normal labor, the fundus for a few days after labor is held up rather high. This is only for a short time and the rate of involution proceeds normally thereafter. The uterine and abdominal wounds coincide for a small part of their extent only, and adhesions are unlikely.

During the whole operation, none of the abdominal organs except the uterus are visible, and the smoothness of the convalescence of these cases will surprise one who sees it for the first time. It is like that of a normal labor case. The field of the operation is limited, but in its field it is a very useful procedure.

4. THE PORRO OPERATION, WITH DROPPED STUMP.

This is the operation for clean cases complicated by fibroid tumor or other complication making the removal of the uterus desirable, but not in a case where infection is suspected. It is also not a method for sterilization of the patient where such a procedure is justifiable.

Technic.—1. Up to the point where the uterus would ordinarily be closed, the technic is precisely the same as in the first method described.

2. The edges of the uterine wound are clamped together and the uterus removed by clamping both broad ligaments, cutting down to the uterine arteries; clamping and cutting them; separating the bladder anteriorly and amputating the uterus below the internal os. All this precisely the same as the ordinary supravaginal hysterectomy, complicated by considerably more bleeding.

3. The cervical stump is tightly closed over the cervical canal, using both interrupted and continuous No. 2 chromic catgut, as it is vital to prevent leakage. This step of the operation is done as soon as the uterus is removed.

4. The broad ligaments and uterine arteries are next tied, and the peritoneum closed over the stump, across the pelvis.

5. The abdomen is then closed as usual.

This is not a frequently needed operation. Five per cent. of Cesareans would be a liberal estimate of the need for it.

5. THE PORRO OPERATION WITH MARSUPIALIZATION AND EXTRA-PERITONEAL FIXATION AND DRAINAGE OF THE CERVICAL STUMP.

This is also an operation of limited field. Its two chief indications are: 1. A case undoubtedly infected before operation, but in whom craniotomy is not to be considered, on account of the child's condition. 2. Ruptured uterus.

Technic.—This is precisely the same as in the operation immediately preceding, except that when the stump has been carefully closed, it is brought up in the lower angle of the abdominal wound. The parietal peritoneum of the wound is then sewed around it in such a way as to prevent communication with the general peritoneal cavity. The abdominal wound is then closed, except for the pouch at the lower angle, at the bottom of which is the cervical stump. This pouch is packed with gauze and drained and allowed to close by granulation.

This operation is rarely needed, but when indicated it gives the patient a greatly increased chance of recovery.

In all these methods, the vaginal packing is removed at the close of the operation, or at most after six hours.

When it is desired to sterilize a patient, it is best done by the excision of the tubes at the uterine cornua, the removal of the inner inch of the tube, and the closure of the cornua, bringing the stump of the tube between the layers of the broad ligament. Mere ligation of the tubes is not sufficient.

All Cesarean sections, whose recovery has been uncomplicated, can sit up after the fourteenth day.

COMPLICATIONS DURING AND AFTER OPERATION.

1. *Hemorrhage.*—The bleeding during the operation is usually no more than after a normal labor. If it seems excessive, it should be remembered that the greatest possible irritation of the uterine

muscle is the insertion of the necessary sutures. The suturing should therefore be begun without delay. In emergency, the bleeding can be controlled by compression of the broad ligaments, but this is rarely needed.

Postpartum hemorrhage is not greatly to be feared; the only cases in the series on which these conclusions are based were three in which no hypodermics of ergot were used. In all three of these, the bleeding was controlled by uterine packing. I should not hesitate to pack or irrigate a uterus sewed up as herein described.

2. *Infection*.—This is the most serious complication, as it nearly always takes the form of peritonitis. The danger can be minimized by careful selection of the type of operation performed, and should peritonitis develop, the Fowler position, stimulation and drainage are our only means of combating it.

3. *Distention*.—It is not uncommon to see considerable abdominal distention after a Cesarean section. Peristalsis is active but the condition requires energetic treatment, not so much on account of any danger, but of the extreme discomfort. Hypodermic of eserine salicylate gr. $\frac{1}{40}$, strychnin sulph. gr. $\frac{1}{30}$ every four hours; Hypodermic of $\frac{1}{2}$ ampule of pituitrin twice daily; high enema of alum oz. 1 to the quart; the rectal tube left in place several hours at a time; and, if there is much gastric tympany, lavage. This routine will correct the trouble within forty-eight hours as a rule.

4. *Fever*.—Especially in primiparæ, there may be a rise of temperature to 102 or over about the fourth or fifth day, accompanied by some foul odor to the lochia. This is due to a lack of vaginal drainage, and usually not to any retention of clots in the uterus. A daily vaginal douche of sterile water is all that is required. I would not hesitate to irrigate the uterus in these cases, if it should be required, but it is very rarely necessary.

5. *Stimulation* is given, when needed, by hypodermics of digitalin gr. $\frac{1}{10}$, strychnin sulph. gr. $\frac{1}{20}$, camphorated oil in emergencies, but not intravenous injection of salt solution unless the need for stimulation has been caused by loss of blood. Simple postoperative shock will react better without the intravenous.

Preparation.—In cases of elective operation, the abdominal skin is as carefully prepared as for any other section. Most of the cases are emergencies, however, and a satisfactory skin preparation is thoroughly to shave, and then cover the abdominal skin with a thick poultice of tincture of green soap, held on by a binder. This is left on until the patient is on the table, then removed and the skin further cleansed with alcohol and covered with rubber dam, through

which latter the skin incision is made. The dam answers the same purpose as the surgeons gloves: If one skin is covered, why leave the other exposed?

Anesthetic.—Should not be gas. Ether or chloroform are preferable. The gas is dangerous to the child. The operation can be done under local anesthesia, but this is undesirable. So little time is needed for the operation, that the short anesthetic period is without risk.

Child.—It is always advisable to have a trained assistant to conduct the revival of the baby. These babies often show the effects of the anesthetic to the mother and require considerable attention. Particularly is this true when previous attempts at delivery have been made, with extra periods of anesthesia and possible injury to the child. It is common to see these babies born in asphyxia livida, and they require careful handling. The operation by no means guarantees safety for the child, when all these factors are taken into consideration.

Results.—The conclusions reached are based upon the writers personal experience of 118 operations with three maternal deaths, a mortality of 2.54 per cent. The series is consecutive and unselected, all done by one of the methods detailed above. One mother died of peritonitis, due to infection probably at the time of operation; one of peritonitis due to premature absorption of catgut and leakage from the uterine wound; and one from hemorrhage, not uterine in origin, but from a ruptured varicose vein in the broad ligament. This was proven by reopening the wound after death. My records of the child mortality are unfortunately not complete. I have the records of fourteen, and it must be remembered that in many of these patients previous and often violent methods of delivery had been attempted. Cesarean section done as a last resort, after attempts at delivery, will always be attended by a fairly high fetal mortality, but for the mother is infinitely better than violent delivery, not only in its immediate dangers, but in its effect upon the mother's future health.

1823 PINE STREET.

CESAREAN SECTION IN A CASE OF SCOLIORACHITIC PELVIS.

BY

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(With illustrations.)

At the present time we have no absolutely perfect classification of the different kinds of abnormal pelvis. While some follow Tarnier and Budin's classification and others follow that of Schauta, I, from a practical point of view, generally follow the convenient and satisfactory grouping of the kinds of abnormal pelvis into the following classes:

- (1) Pelvis increased equally in all the measurements, justomajor.
- (2) Pelvis decreased equally in all the measurements, justominor.
- (3) Pelvis flattened from before backward.
- (4) Pelvis flattened from side to side.
- (5) Pelvis irregularly distorted.

The following case comes under the fifth class. It is an irregularly distorted, a scoliorachitic pelvis. I am induced to report it because of its rare and special features.

Case Report.—B. D., colored woman, single, aged twenty-four, household worker, entered the hospital April 22, 1915, at 11.45 P.M., complaining of difficult first labor at full term and of twenty hours, duration. On the morning of April 22, 1915, she felt pains in the abdomen and noticed a blood-stained mucous discharge at vulva. At 9 P.M. on the same day, a midwife was called who after making repeated vaginal examinations sent for doctors G. W. Cardwell and H. D. Walker who, after making also vaginal examinations, ordered the patient's removal to hospital.

Family History.—Her father and mother are dead, cause of death unknown; they were of normal size and had no deformities; she has no brothers or sisters and lives with an aunt.

Past History.—She was a bottle-fed baby; suffered from rickets as a child; and was not able to walk until she was seven years old. Her menstruation began at the age of twelve years. It was regular of the twenty-eight-day type. The day before each menstrual flow she felt heavy weight in the pelvis and pain in the back and had a slight pale discharge. The bright red discharge lasted for one day only and confined her to bed owing to the pains. On the following day both the discharge and pain ceased, she felt well and was able to resume her work. The total quantity of loss was approxi-

mately 4 ounces. She had no intermenstrual discharge. She had no previous pregnancies. About the middle of July, 1914, she noticed the cessation of menstruation; during the following September she had nausea, morning sickness, frequent micturition, and her breasts began to get larger; and during November she noticed a swelling of her abdomen. She felt no quickening and although she knew she was pregnant, she kept it to herself until labor had begun.

Physical Examination.—The photographs, although taken during convalescence as I had not the facilities to take them at midnight, the



FIG. 1.

time of admission, will clearly show her general appearance and configuration to be abnormal. Her height was 3 feet and 8 inches; her weight 72 pounds; and her measurements round the chest at the level of the most prominent point of the dorsal curve 3 feet, and round the abdomen at the level of the umbilicus 3 feet and 10 inches. On inspection the following anomalies were observed from below upward: flat feet; bent and distorted legs; curved thighs; shortening of the left leg; marked obliquity of the pelvis; twisting of the sacrum; the left lumbar region more prominent posteriorly; the right ilium unduly prominent anteriorly; displacement of the body to the right; asymmetry in the side of the back and great difference in the size and shape of the two halves of

the thorax caused by the severe double lateral curvature of the spine, right dorsal scoliosis and left lumbar scoliosis; the spines and bodies of the vertebræ were markedly rotated, the rotation being toward the convexity of the lateral curvature; the dorsal and lumbar concavities were flat; the last right rib overrode the right iliac crest; the left iliac crest overrode the last left rib; bulging of the right ribs and prominence of the right chest; the right shoulder blade, on the convex side of the dorsal curve, raised by the underlying ribs, was more prominent and further removed from the median line of the back; the left shoulder blade, on the concave side of the dorsal curve was nearer to the vertebral spines; elevation of right shoulder; left shoulder drop; and hanging of the right arm further from the side than the left.

In consequence of these curvatures the bodies of the vertebræ were thinner on the concave side and thicker upon the convex side, the discs had suffered a similar change and had undergone partial atrophy from continued pressure, and the ligaments and muscles of the spine were longer on the convex side and shorter on the concave side. A röntgenogram taken by Dr. I. Fearing, radiographist to the hospital, illustrates most of the above-mentioned extensive abnormalities.

The patient's head was not large and there were no nodular prominences on the chest, rachitic rosary. Milky fluid escaped from the breasts on squeezing.

Inspection of Abdomen.—The umbilicus was flattened out and the abdomen pendulous and fallen forward.

Palpation of Abdomen.—The parts of the child were felt and its lie discovered. It was left occipitoanterior and this in spite of the mechanical conditions present which favored the occurrence of abnormal positions of the fetus. The head was not engaged in the brim and consequently great mobility and overriding were observed. No uterine contractions were felt.

On auscultation the fetal heart was heard on the left side a little below the level of the umbilicus. Having learned that the membranes had ruptured I did not make a vaginal examination.

There was no hypertrophy or dilatation of the heart. The lungs were compressed, especially the right. The liver and other abdominal organs were displaced. The general symptoms which usually accompany such a severe grade of scoliosis were absent: the general health of the patient was not impaired; her digestion was good; she had no shortness of breath and suffered no pulmonary disease; and she never had any thoracic or abdominal pains to indicate any compression or irritation of the intercostal nerves.

From the observation of these physical signs I became aware of the presence of pelvic deformity and proceeded to take the pelvic measurements.

Diameters of the Superior Strait.—The anteroposterior, or true conjugate, 5 cm., the transverse 9 cm., from right sacroiliac synchondrosis to left iliopectineal eminence 7.5 cm., from left sacroiliac synchondrosis to right iliopectineal eminence 9 cm. Knowing that in the determination of the internal measurements we have no

method that can claim to give perfectly accurate results I had these measurements made three times with Skutch's pelvimeter, twice by Dr. W. A. Peters and once by myself and where these three measurements were found not to be nearly identical I took the average.

Diameters of the Inferior Strait.—Anteroposterior, from the lower margin of the symphysis pubis to the tip of coccyx, 10.5 cm., transverse, between the inner margins of the ischial tuberosities, 11 cm. The following further diameters were measured and found to be: the diagonal conjugate 6.5 cm., the external conjugate 13 cm., the interspinous 22.2 cm., the intercrystal 19.5 cm., the intertrochanter 20.5 cm., the interischial spines 9 cm., from the left anterior superior spine to the right posterior superior spine 16.5 cm., from the right anterior superior spine to the left posterior superior spine 19.5 cm., from the spine of the last lumbar vertebra to the right anterior superior spine 15 cm., to the left anterior superior spine 14.5 cm., to the right posterior superior spine 3.5 cm., and to the left posterior superior spine 4.3 cm., from the left tuberosity of the ischium to the right posterior superior spine 19.5 cm., from the right tuberosity of the ischium to the left posterior superior spine 17 cm.; from the top of the sacrum to the right ischial tuberosity 15 cm. and to the left ischial tuberosity 16 cm., from the right trochanter to the left posterior superior spine 21.5 cm., from the left trochanter to the right posterior superior spine 20 cm., from the lower margin of the symphysis pubis to the right posterior superior spine 16 cm., and to the left posterior superior spine 16.8 cm. There was a slight deviation to the right of the symphysis pubis from the promontory of the sacrum about 1 cm. in extent. The tuberosities of the ischii were directed outward; the subpubic angle widened; and the left sacroiliac articulation ankylosed (as seen from the röntgenogram).

Diagnosis.—Dystocia due to scoliorachitic pelvis.

Differential Diagnosis.—(1) In pseudoosteomalacic pelvis, which is due to rickets, the triradiate pelvis, caused by the pushing in of the acetabula and consequent approaching of the sacrum and lateral walls to one another, is much commoner. (2) In rachitic dwarf if the deformities were straightened the stature would still fall far below the normal height. This patient although of very short stature, 3 feet and 8 inches, yet were her deformities straightened she would not fall below the average normal height. (3) In Naegele's pelvis as well as in this case, which is also obliquely contracted but not to such a degree as Naegele's, we find the following conditions: The existence of scoliosis; the variation in the height of hips and the distance between the spine of the last lumbar vertebra and the posterior superior spine on either side; synostosis between the sacrum and ilium on the affected side; rotation and displacement of sacrum toward the diseased side; displacement of the symphysis pubis toward the sound side; straightening of the ileopectineal line on the affected side; and shortening of the oblique diameter starting from the sound side, and of the transverse diameter. The diminution in the breadth of the innominate bone and the width of the sacrosciatic notch on the affected side was very slight in this case.

In Naegele's pelvis the true conjugate is usually unaltered and the tuber ischii are directed inward. In scoliiorachitic pelvis the true conjugate diameter is shortened and the tuber ischii are directed outward. (4) In rachitic flattened pelvis the transverse diameter shows rather an increase in size than diminution and the ileopectineal lines an increase in the curve. In a purely rachitic pelvis the abnormality is a flattening from before backward. In scoliiorachitic pelvis besides the anteroposterior flattening we observe oblique contraction because the characteristic pelvic changes due to the anomaly of the vertebral column are superadded to those resulting from rachitis.

Treatment.—As spontaneous version or forceps delivery was impossible and extraction by perforation, cephalotripsy and cleidotomy, even if possible, was unjustifiable owing to the child being viable, and pubiotomy or symphysiotomy was precluded because of its uselessness in a pelvis contracted to this degree, true conjugate 5 cm., Cesarean section was the operation absolutely indicated. In deciding upon the method of performing Cesarean section I did not consider Frank's method because the extraperitoneal incision exposes a large area of connective tissue whose resisting power to infection is inferior to that of the peritoneum; and as it is frequently necessary to tear through the peritoneum this method becomes deprived of its supposed advantages.

Further I chose the classic in preference to the abdominal-cervical Cesarean section for the following reasons: (1) In my past experience of the classic method I have been so fortunate not to meet with the dangers and complications described by Sellheim: maternal, infection of peritoneal cavity and culture collection in it from the blood and amniotic fluid discharge; severe hemorrhage; injury to the intestines; formation of adhesions and fixation of uterus; stretching of scar; and abdominal hernia. Fetal, the asphyxiation of the child from the manipulation of the uterus. (2) The disadvantages of the abdominal-cervical Cesarean section rather discouraged me. These disadvantages are described by Montgomery as follows: "First, a difficult and uncertain technic which involves the transverse as well as the extraperitoneal incisions; second, the difficult delivery of the child with the danger of extended tearing of the incision; third, the position of the scar in the thinnest part of the uterus with consequent danger in recurring pregnancies; fourth, danger of cervical fixation in the pelvis favoring retroversion, retroflexion."

This choice of the classic Cesarean operation I made in spite of the late admission, the rupture of the membranes, and the probability of infection owing to the repeated vaginal examinations made by the two doctors and by a midwife of doubtful cleanliness.

Preparation of Patient.—There was no time to give the patient a warm bath. An enema was given to empty the bowels; the bladder was emptied by a catheter; the pubis shaved; and the external genitals cleansed. The vagina was douched with 1 gallon of creoline solution, and care was taken not to force the fluid into the vagina under pressure and carry contamination from the vagina into the uterus. On the operating-table the whole surface of the

abdominal skin was painted with tincture of iodine, $2\frac{1}{2}$ per cent. strength.

Operation.—The ordinary abdominal incision in the median line was made. It was 6 inches long and extended downward to a point 2 inches above the pubis. The layers of the abdominal wall were noticed to be thin. The peritoneum was cautiously picked up and opened near the umbilicus and using the index and middle finger of my left hand as director, I divided it to the length of the skin incision. The pregnant uterus presented itself and no intestines were found lying in front of it. By pressing the abdominal wall on each side of the incision downward and backward the uterus was brought out of the wound. The intestines were pushed up toward the diaphragm and kept back by a sponge of plain sterile gauze wrung out in warm sterile salt solution. The skin incision was clipped with forceps round the lowest part of the protruded uterus and covered by a large sterile towel upon which the uterus rested. A sterile sheet with a 6-inch longitudinal slit cut in it was spread over the uterus. Through this slit I rapidly made in the middle line of the uterus, as it lay in a straight line with the skin wound, an incision 6 inches long. There was no escape of amniotic fluid and no free flow of blood to make it necessary for the assistant to pass his hands through the abdominal wall into the pelvis and compress the broad ligaments against the lower uterine segment. As soon as the incision was made I plunged my hand into the uterine cavity, caught a knee, extracted the child; clamped and cut the cord, handed the child to the nurse and peeled off the placenta and membranes. The placenta was found lying posteriorly and the cervix sufficiently open to allow of vaginal drainage. The extracted child was a living female, well nourished, and weighed 8 pounds. Immediately after the extraction the patient was given 1 c.c. of pituitary extract hypodermatically. In sewing up the uterus, which contracted as soon as it was emptied, I used No. 3 silk. The sutures were interrupted, half an inch apart, passed deeply through the uterine wall excepting the decidual membrane, were not tied until all were in position, and were cut short. These sutures were buried by a continuous seroserous suture.

I then removed the sterile sheet which covered the uterus and the sterile towel which covered the abdominal incision; unclipped the abdominal wound; allowed the uterus to fall back into the abdomen; withdrew the sponge of gauze which served to keep back the intestines toward the diaphragm; and closed the abdominal wall in three layers.

As I do not advocate the surgeon's right to sterilize a patient to avoid the possibility of future conception I made no attempt at such an operation, especially as the patient's consent was not given.

On the tenth day after operation the wound was inspected and found to have healed and the stitches removed. The patient was kept in bed for three weeks and was discharged on May 20, 1915.

ASPHYXIA PALLIDA, RESULTING FROM EARLY SEPARATION OF LOWER TWO OF FOUR PLACENTÆ.

BY

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(With one illustration.)

SHORTLY before 1.00 P. M. Apr. 17, 1916, I was called to see Mrs. A. B., who was in labor at Providence Hospital. The patient was a primipara, twenty-one years of age, whose family and personal history were of no interest to the case. Menstruation had been normal and regular until her last period which began July 15, 1915.

Pregnancy had taken a normal course, except for a slight trace of albumin, until early in the morning of April 17th when blood began to appear from the vagina. About 10.00 A. M. pains were coming at fifteen-minute intervals and hemorrhage increased. Clots were expelled at frequent intervals with the uterine contractions. Dr. Arthur Northrup sent her to the hospital where I first saw her.

Patient was very pale and had an anxious expression. Pulse was 120 and weak, temperature 98, respiration 24. No fetal sounds were to be heard and patient said she had felt no movements since entering the hospital. The uterus was oval, lacked tone, felt rather boggy and was the size of a nine months' pregnancy. The fetus lay in the right occipitoanterior position with the head unengaged. The external pelvic measurements were normal.

Internal examination revealed a normal-sized pelvis, medium-sized vagina filled with clotted blood, the cervix thinned out, the external os 4 cm. dilatation, membranes intact, no placental tissue to be felt.

Diagnosis of premature separation of a normally situated placenta was made.

At 1.30 P. M. dilatation was completed manually under ether anesthesia. The membranes were ruptured and a bipolar podalic version was performed, the right hand bringing down the left leg. An easy extraction completed the birth of a premature fetus weighing 2100 grams, 47 cm. long. The fetus was in the condition of asphyxia pallida from which it was resuscitated in about twenty minutes with the aid of a lungmotor.

On account of hemorrhage and the anemic condition of the patient an immediate expression of the placenta was attempted. As it was still fast, a Credé expression was performed. It was with difficulty that placenta and membranes were delivered by this method.

The after-birth consisted of four distinct placentæ and membranes which were traversed by numerous blood-vessels. The cord was attached to the center of the largest placenta, which was almost circular, 10 cm. in diameter and 1 cm. thick. About 5 cm. away at

the same level was the second largest placenta rather oval in shape, 8.5 by 6.5 cm. and 1 cm. thick. The uterine surfaces of these were soft and normal. A little below the first placenta were the two smaller placenta which were both circular, being 8 and 3 cm. diameters and slightly thinner than the other ones. The uterine surfaces of these two were hard and covered with clotted blood. A very rich vascular circulation ran through the membranes, every inch of

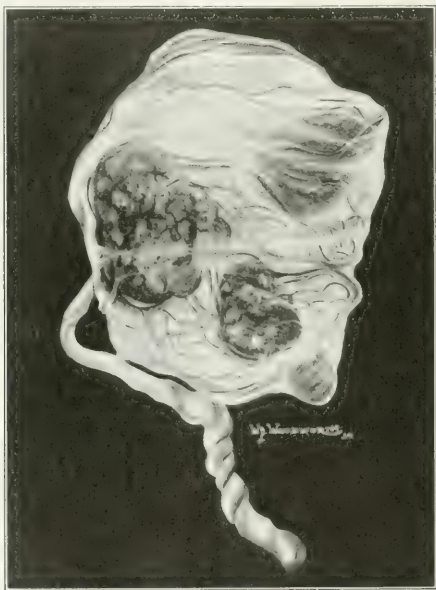


FIG. 1.—Multiple Placenta.

which contained one or more vessels. The placenta \ae were normal histologically.

The two larger placenta \ae were evidently attached to the side of the uterus below the fundus. The smaller ones were attached to the lower uterine segment, but were not placenta \ae previa \ae . The uterine contractions loosened the two lower ones as the lower uterine segment was dilated. The detachment of these produced the severe hemorrhage from their sites of attachment to the uterus. After this detachment, the two larger placenta \ae which continued in attachment permitted sufficient aeration of fetal blood for several hours.

But this placental attachment was insufficient for the oxygenation of its blood, thereby causing asphyxia pallida in the fetus. The fetus had not breathed in the uterus as there was no fluid or mucus in the air passages. After proper aeration of its blood the fetus recovered, color returned and it was normal.

Résumé.—The fetus had four placental attachments, two of which were at the lower uterine segment. Uterine contractions separated these causing a severe hemorrhage from the decidual surface as from placenta previa. The oxygen-carrying capacity of the mother was lessened from the loss of methemoglobin in the blood lost. The fetal asphyxia, however, was mainly due to the decrease of active placental surface when the lower placenta were detached. It is remarkable that the remaining placental surface, consisting of a little over one-half of the total was capable of oxygenating the fetal blood for about four hours.

608 MT. ELLIOTT AVENUE.

PUERPERAL INFECTION.*

BY

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I BELIEVE those operators who are the most familiar with this variety of infection, look upon it with the greatest apprehension and know that it is little under control of the surgeon.

When you find a condition which will not submit to amputation surgery on account of the nature of its pathology, you may put it down as almost axiomatic that the condition from the standpoint of the surgeon is not satisfactory and this is most typically shown in the puerperal infection.

I feel if the condition was discussed from the standpoint of wound infection of the birth canal, we would have a better understanding of the nature of its pathology, for wound infection of the birth canal is what it is, no more, no less.

The treatment of puerperal infection is so unsatisfactory from every standpoint, that were I asked to briefly discuss treatment I should say, prophylaxis, and then continue my discussion by attempting to teach hand-washing. I am constantly impressed with the unpleasant fact that men know little indeed about rigid personal toilet and do not live up to the antiseptic or aseptic chain throughout their work.

* From the clinic of the Joseph Price Hospital.

The rubber glove is put on the unclean hand; the gloved hand is quickly infected and not scrubbed. There is no doubt in my mind but that the rubber glove has dulled the aseptic conscience of the surgeon. It is all very well for the advocate of the rubber gloves to say you cannot produce an aseptic hand, but operators take privileges with the gloved hand which no thinking surgeon should ever take. I know as far as my own experience goes, and it has not been small, that 95 per cent. of the cases of puerperal infection are unnecessary and due to some one's carelessness. The mortality from this infection is frightful and very much higher than text-books indicate, for the reason, that a great number of cases are reported as recoveries from puerperal infection which should not be classed as examples of wound infection of the birth canal which is truly puerperal infection and shows its true nature through the evolution of its pathology. A large number of patients are sent to hospitals and operated for supposed puerperal infection, when in reality the condition is due to a preëxisting infection of the uterine appendages of probable gonorrheal origin. I have seen many examples of this mistaken pathology; the error comes from the fact that the infection which had previously existed had been lighted up incident to the natural trauma of labor and on account of its coexistence, had been diagnosed as puerperal infection. The pathology of puerperal infection or wound infection of the birth canal is as different from gonorrheal infection, as day differs from night. I am sure this is no exaggeration.

The operator's mental picture should be just as well defined, or he will go wrong in his operative expectancies.

Gonorrheal infection is a mucous membrane infection; it spreads through extension of the mucous membrane and if it does extend by the circulation to a certain organ, it destroys that viscus, yet largely confines itself to that organ. Not so with puerperal infection, which is little an infection of the mucous membrane but a wound infection, and extends through the medium of the circulation, blood-vessels and lymphatics and has not the tendency to remain an infection of any single organ, but is infiltrating in its extension and this is the reason the condition is less surgical than gonorrheal infection.

Puerperal infection is more truly a cellulitis, if the pathologist will permit me to use such a term. I believe the pathology of gonorrheal and puerperal infection is so distinct that an operator should be able to tell the difference blindfolded. Although we look upon puerperal infection as a streptococcic one, yet it would probably be

impossible to obtain an isolated culture of such germ. It is truly a wound infection, which is a mixed infection. It is true, in those cases of severe puerperal infection that the streptococcus may be obtained from the blood and in abundance from the vaginal or uterine discharge; yet, it is my opinion that the virulency of the condition is most probably due to the fact that the streptococcus infection does not have the tendency to remain as a local infection but early becomes a true bacteremia and is an infiltrating infection which is revealed by its pathological topography.

I speak of pathological topography because the surgeon must not only have a mental picture of the abdominal topography of puerperal infection, but he must know the nature of the route of the infection.

Is the mass which he discovers a removable one, can it be enucleated, are there lines of cleavage which may be followed permitting removal of the mass, or, is the mass composed of infiltrated, irremovable, important structures? This is what I mean by pathological topography, and it is most important that the surgeon knows the difference between the topography of gonorrheal infection and that of puerperal infection.

I have seen some of the most disastrous mistakes because the surgeon did not have just this mental picture; did not know the possible or improbable lines of cleavage and was not familiar with the fact that puerperal infection is not, in a sense, a pathological entity permitting enucleation and removal. It has always seemed to me, as operators we should confine our discussions to the work we have to do; the manipulations which are necessary to accomplish the steps of the operation, the application of the surgery to the probabilities and possibilities of the pathological condition; this is our field and we will never be big enough to learn it all.

Let us permit the embryologist to write the embryology and the bacteriologist to write the bacteriology and not fill our surgical papers and discussions with branches of the profession which we have recently reviewed, in order that we may say something which seems ultra and about which we know nothing. Should we ever review a subject in order that we may write a paper on that subject? I have always felt one should not write unless he had lived for a good length of time in the experience of his subject. You must live your subject. Your papers and discussions will be rejected by the popular opinion for a time, but right will prevail and you will have your day. There must be individuality in your work or you are only a parasite upon the profession. Do not take down six text-books from the shelf and write the seventh therefrom. Do not be one-seventh of the book you write.

In order to get the proper mental picture of puerperal infection, we must go back to the nature of its etiology and the plan of its communication to adjoining viscera. Puerperal infection being a wound infection, is all the more probable that it should become a blood-vessel and lymphatic infection, and that it should extend as a cellular infiltration.

The pathology of puerperal infection becomes most apparent when we realize that it is truly a retroperitoneal one; that it has not the resisting powers of the peritoneum to limit and define the area infected.

I fail to see why the streptococcus which is so uniformly found in puerperal infection, should have any special mode of extension, were it not that nature's barriers, the mucous membrane or the endothelium of the peritoneum had been destroyed and the condition had its origin as a typical wound infection. Therefore, we must start out with the mental picture that the condition is an infiltrating one, possibly not properly called a cellulitis, but this conveys the topography of the condition, namely, that it is not a gonorrheal infection (a mucous membrane lesion), that it does not confine its infiltrating infection to a single viscus, its extent of involvement is little influenced by mucous or endothelial membrane (peritoneum), as it is primarily and throughout its course either a submucous or a retroperitoneal infection. It has no tendency to be self-limiting, as its mode of infection is not confined within the mucous or peritoneal coverings of any particular viscus, it infiltrates the mesentery of the viscus and is thus endless in its extension. It does not have the tendency to destroy an organ to the extent of gonorrheal infection and produce great quantity of pus which distends the viscus to its limits, but does produce great tumor formation by infiltrating the structures throughout. The surgeon must have such picture in his mind when he attempts to deal with the great mass produced by puerperal infection. He cannot remove that mass.

When produced by gonorrheal infection, he can enucleate and remove the same. The gonorrheal mass has lines of cleavage and is surgical in every particular from the standpoint of enucleation and removal.

The puerperal mass has no lines of cleavage, is not removable and in this sense is not surgical. The one condition, puerperal infection, is a deep infiltration of infection behind the mucous membrane or peritoneum with little tendency to limitation; the other, gonorrheal infection, is a surface infection and extends largely by surface continuity with tendency to limitation.

This is the picture I wish to convey to the operator in order that he will not pass his fingers through the mesentery of important structures in his attempt to enucleate a large puerperal mass. He may also have this picture in mind, the gonorrheal mass has a pedicle with lines of cleavage leading to the same; the puerperal mass has none, it is truly an infiltration of all structures in its neighborhood.

Let us dissect the two masses, one from gonorrheal infection, the other from puerperal infection. The two conditions as a rule, present a different picture from external inspection. The mass from gonorrheal infection is nearly always bilateral and the abdominal wall from inspection and palpation reveals, in the exaggerated conditions, the lower one-half of the abdominal cavity uniformly distended or consolidated. Not so with a very large percentage of cases of puerperal infection, which are as a rule, unilateral conditions, or at least, the extension of the pathology has been more marked or extensive on one side than the other and is probably due to the fact that the injury or wound infection of the birth canal has occurred on the side of the more extensive pathology and has extended through the broad ligament to the lateral structures.

In gonorrheal infection you will find the true pelvis consolidated and impossible to enter at any point—I am speaking of the late neglected cases—the infection remaining confined to the uterine appendages until their destruction is quite complete; the intestine, colon and omentum coming to the rescue of the general abdominal cavity and have little or no defensive quality as far as the destruction of the uterine appendages is concerned.

In puerperal infection the periuterine structures external to the uterine appendages are most involved and we find the infection extending out through the broad ligament and mesentery of the colon, which most often constitutes the greater part of the infiltrated mass. The tube and ovary may often be found incarcerated in this mass and yet be in a good state of preservation, for this reason the puerperal woman is more apt to conceive than the gonorrheal patient in whom the tube and ovary are destroyed. The puerperal mass is less complicated by adherent bowel for the reason that the nature of its pathology is not that of a peritonitis but an infiltrating infection of the deeper structures.

The gonorrheal mass has lines of cleavage because it is an infection largely of the mucous membrane and peritoneum and, therefore, confined to the destruction of particular viscera, even in those cases where the infection seemed to have come by the way of the circulation, the infection is still much confined to the destruction of that

organ which gives the lines of cleavage and permits enucleation. Not so with puerperal infection which can be said is largely a retroperitoneal one extending to the viscera through their mesentery and is therefore more infiltrating than destructive, and thus does not give lines of cleavage nor permit of enucleation. The high death rate of puerperal infection is not due entirely to the nature or virulency of the infecting source, but the condition is unsurgical from the standpoint of its pathological topography, in that the infected mass cannot be enucleated or removed. In a certain percentage of cases of puerperal infection there is some occlusion of the tubes. It is my opinion that such is due to the mixed infection other than the streptococcus, as a large percentage of cases of puerperal infection are sufficiently infected with colon bacillus, gonococcus and staphylococcus to produce occlusion of the tubes, or even produce a fatal condition independent of the streptococcus.

As surgeons it is enough but necessary for us to know, that puerperal infection is wound infection, therefore, it is a deep infection, a submucous or retroperitoneal one; that it extends by infiltrating the uterine and periuterine structures; that it invades structures through the circulation and, therefore, is in this sense an infection and an infiltration of the mesenteries of the viscera or the gross structure of the organ itself, ere it becomes a peritonitis. Also, that the puerperal mass is not a removable one, being composed of infiltrated viscera rather than destroyed organs. It is because of this pathological topography that the surgical treatment of puerperal infection is a nightmare to the surgeon.

It must be apparent to those who have this mental picture of the condition, that our high death rate is not altogether due to nature of the infection, but because we cannot thoroughly remove the pathological mass.

One's victories in surgery are directly proportionate to one's ability to thoroughly remove the distal infecting source. There is no exception to this rule and we never so much needed such advice as at this present age of insanity of uncertainty.

I regret I cannot make the positive argument for radical surgery in puerperal infection that I made in my discussion for gonorrheal infection.

I have given as my reasons the topography of puerperal infection. In regard to general treatment in hospital practice, there is always some doubt in regard to retention of infected débris within the uterus.

If you have had charge of the patient from the beginning, this

uncertainty should not exist. If the patient is sent from questionable medical advice, determine the presence of any retained products and remove the same by finger. These patients should not be traumatized with the sharp curet; there is always sufficient infecting means within the uterus of the puerperal patient to cause systemic infection, if the endometrium is harrassed with the curet. I put these patients to bed, keep them on liquid or light diet and give saline by the bowel. I do not think we should resort to hyperdermoclysis or intravenous injection of saline, on account of danger of local infection at the site of the needle puncture or even systemic infection; remember, the patient is suffering from a true bacteremia, so all structures are low in resisting powers. Every effort must be made to give the patients supportive treatment, they are suffering from a true blood dyscrasia which extends at times over a period of months and are, therefore, in need of concentrated food of the greatest nutritive value.

In regard to serum treatment, I always give them the benefit of antistreptococcus serum, for I believe it has some real merit. I believe the pathologists and bacteriologists are in accord that a specific toxin has not been recognized in the puerperal patient; therefore, we have not at present a specific antitoxin for the puerperal patient. The serum, I believe, acts as a bactericidal agent and we have been cautioned in regard to the use of serum on account of this bactericidal action; therefore, we are advised to give the serum as early as possible before the greatest number of bacteria are in the circulation, so as to avoid toxemia due to the bacteria in the blood destroyed by the serum.

I am not comfortable in my discussion of the serum treatment of any disease; I refer the reader to those distinguished gentlemen who have given the profession one of the greatest of blessings. I have little patience with discussions which are not from personal experience.

I should like to discuss this phase of the subject under the single term prophylaxis. I like the etymology of the term, namely, prophylaxis,—“the guard that stands before.”

It pays to be a perfect crank about hand-cleansing. When you think you are sufficiently clean to operate, just begin again and scrub several times more. Operator's ideas about hand-cleansing are the most miserable of all their virtues. Remember that puerperal infection is a wound infection in an area prone to contamination, therefore, exercise the greatest degree of surgical cleanliness. Close all lacerations of birth canal immediately; keep away from

the patient before, during and after labor. This may be a little epigrammatic but the reader should get the sense. Remember that puerperal infection is prevalent in the overrich and very poor; the overrich are too much courted and examined, the very poor are not given time to end their labors naturally. The man who has no patience has no right to do obstetrics. In the first place, he will not take time or use sufficient energy to get clean; again, if he has had just a wee bit of surgical training, a large percentage of his patients will be operated upon unnecessarily.

First, be a man; secondly, a clean man; third, be a man with a soul. This may seem to the reader to be foreign to the discussion of the question, not so in any particular. If the above advice is lived up to, 95 per cent. of the death rate from puerperal infection will be wiped out. At this present date there is more room for an honest preacher in the profession than there is need of surgical advice. Let us catch up to our surgical and medical privileges, they are magnificent.

The puerperal patient should be isolated for the protection of all other obstetrical and surgical patients. In regard to an antiseptic douche for the puerperal patient, I have not much confidence in obtaining any material benefit from the same; a low douche given with great care and gentleness may be indicated as deodorant. I am always afraid of forcing infected débris into the uterine cavity. I do not make interuterine applications on account of trauma from the same and thus open up raw areas for infection to be rekindled.

WHEN DOES THE PUERPERAL PATIENT BECOME SURGICAL?

From the standpoint of amputation surgery, puerperal infection is rarely surgical other than indirectly through its complications. In the acute or the very early stages of the infection, which is truly an infiltration of the uterine and periuterine structures, during which stage the Fallopian tubes are swollen and turgescant and probably leaking purulent discharge from their patulous fimbriated extremity, it is unsafe to attempt amputation of the uterine appendages for several reasons.

In the first place, removal of the tubes and ovaries is only removing a small portion of the pathology, as the broad ligament, mesentery of the colon, uterine and periuterine structures are as much a part of the pathological condition as the tubes and it is most forcibly shown in puerperal infection that you cannot partially remove an inflammatory or infected area and get away with grace. This is the reason that puerperal infection is little surgical as compared

with gonorrheal infection of the uterine appendages which is more a pathological entity, and amputation surgery is followed by brilliant results. The reader will understand by the term amputation surgery, I simply mean removal of the pathological structures.

Permit me again to call attention to the fact that the very foundation of successful surgery is, the ability of the operator to remove the distal infecting source. This can be least done in puerperal infection.

Any attempt at removal of the uterine appendages in this acute stage, is merely stimulating the infection by opening up lymph spaces and encouraging retroperitoneal infection. Many of the puerperal patients who are operated on in this acute stage, die from metastasis of an infected embolus which may be deposited in lungs, kidneys, or most any portion of the body.

Septic pneumonia is a most frequent complication of meddlesome surgery in the puerperal patient. If during the early stage of the condition the patient develops marked distention indicating peritonitis, the picture is different and we must realize that marked distention means bowel obstruction and that the patient can receive her lethal dose of toxins from the enterom or the mucous membrane of the distended and obstructed bowel.

In such conditions I open the patient, relieve the bowel obstruction, puncture the bowel if necessary to release gas and infected fluids, which are often of great amount and most toxic. I flush the abdominal cavity with saline solution at temperature from 115° to 120° , which is a very powerful stimulant. I next place the entire pelvic structures within a mit of gauze or in other words, I surround the uterus, tubes, ovaries and broad ligament by a cofferdam. This cofferdam entirely encircles the pelvic structures. If there is any leakage of purulent fluid from the tubes, it is taken care of by this drain. The cofferdam by filling the entire pelvis has that very valuable mechanical function of preventing the paralyzed and infected bowel from collapsing into the pelvis and producing post-operative bowel obstruction. Elsewhere I have fully described the function of the cofferdam other than that of a mere drain.

In reviewing this surgical treatment of acute puerperal infection, you will find that no lymph spaces have been opened by amputation surgery to permit absorption of infection. The operation is done to relieve the complicating bowel obstruction and prevent peritonitis from the purulent discharge which may be exuding from the tubes.

The other type of cases of puerperal infection in which surgery may be indicated, is found in the patient who has a large mass

usually unilateral which has extended for weeks, is gradually infecting the patient and is beginning to cause bowel obstruction and general extension.

In this class of cases nature has made an attempt at localization. This mass, as my earlier description in this article indicated, is composed of infiltrated broad ligament, bowel and mesentery thereof.

I have often seen the abdominal wall infiltrated and infected throughout; a condition I have not seen from a true history of gonorrheal infection. This well indicates the true nature of the diffusible and infiltrating infection seen in the puerperal patient.

As I have said, you cannot enucleate this mass and amputate the same, as it is composed largely of infiltrated important structures and is truly a retroperitoneal infection. The tube and ovary are often found incarcerated in this mass and may be the cause of the prolonged infection, although the puerperally infected tube does not have a tendency to become occluded, but when surrounded or incarcerated in this huge mass of pathology does become occluded and a true tubal or ovarian abscess may be formed and continue the infection from such source. In this stage the tubes and ovaries may be removed with much less risk of secondary or metastatic infection and the multiple abscesses which may be formed between the viscera composing the puerperal mass, may be drained. If in this stage the tubes and ovaries are removed and their area packed with gauze and the pelvis drained by cofferdam, you will often be surprised to see the remaining mass of pathology composed of broad ligament, bowel, mesentery, etc., melt away. If it becomes necessary to do a hysterectomy on account of multiple abscesses in the uterus, or the big, flabby infiltrated and infected organ, the very best results will be obtained by hysterectomy by the serrenœud which is in a sense an extraperitoneal amputation of the pelvic structures, and also a drainage operation on account of the stump of the uterus being brought outside of the abdominal cavity.

During my first few years with Dr. Price, I assisted him with several hundred hysterectomies by the serrenœud method and can say there is no method which compares with it as far as operative mortality goes. The objections to this method of hysterectomy for all conditions are obvious, but for the purpose of removing the uterus in puerperal infection, it is the ideal method and is indicated because it controls the circulation, opens practically no structures for absorption of infection, is a drainage operation by bringing the stump outside the abdominal cavity and thus prevents intraabdominal infection.

It is an amputation operation without the dangers of the same, as the including wire of the serrenœud prevents absorption of toxins through the incised area. The operation can be done with the greatest dispatch and least degree of shock. There is so much in the surgery of the older operators which has sterling worth but is not fashionable to-day.

If operators were more familiar with the true pathology of puerperal infection, they would not be attempting the extraperitoneal route in Cesarean section on the suspected infected uterus. They have chosen the extraperitoneal route with the idea of preventing a peritonitis and the results have not been satisfactory. The puerperal patient and the pregnant uterus which has been contaminated by meddlesome or legitimate attempts at delivery are pathologically alike, and the patient's life is in danger, not from a peritonitis but a retroperitoneal infection, cellulitis, lymphangitis or, whichever term that implies a truly deep infiltrating infection of the uterus and periuterine and adjacent structures.

The extraperitoneal Cesarean section has failed in the infected uterus, not on account of the peritonitis or the dangers of producing peritonitis by the operation, but proves fatal in the puerperal patient on account of opening up the infected lymph spaces in the uterine wall.

We see here the same principle which prevents us from doing amputation surgery in the acute puerperal patient, therefore, you are not justified in prolonging the Cesarean operation by attempting to do an extraperitoneal route when it is not a peritonitis which defeats our efforts. When the editors will be good enough to permit me to say what I please about this question of peritonitis (and they have not done so as yet) I shall try and bring out the fact that it is not the only danger or complication of the acute infectious lesions of the abdominal cavity, and that the complications of the peritonitis, namely, bowel obstruction followed by mucous membrane absorption, retroperitoneal infection and that infection which comes from permitting viscera to remain macerated in ponds of filth, I say I shall be grateful indeed.

The pathological and surgical histories of peritonitis must be rewritten. When the American profession began to endorse the classification of the peritonitic patient into operative and nonoperative stages, it saw the beginning of the darkest era in the history of American profession. I shall have more to say about this elsewhere.

Do not class the puerperal patient as a peritonitic one, its surgical pathology is entirely different.

Briefly to review the surgical treatment of puerperal infection, operate in the acute stages only when complicated by marked distention, relieve the bowel obstruction, puncture the bowel if necessary to relieve distention and drain infected fluids from the bowel, flush the abdominal cavity with saline solution temperature from 115 to 120, place the entire pelvic viscera in a mat of gauze and permit drains to remain two weeks. Do no amputation surgery.

In the subacute case, the uterine appendages may be removed as at this stage the tubes are often occluded and remain a nidus of infection to the big, infected mass which surrounds them. Pack the area from which the appendages are removed, with gauze; also place cofferdam in pelvis, permitting the same to remain two weeks. In those subacute conditions in which the uterus is largely flabby or infected throughout, containing multiple abscesses in its walls, remove the same by the serenade.

241 NORTH EIGHTEENTH STREET.

HYPOTHYROIDISM A FACTOR IN CERTAIN TYPES OF UTERINE HEMORRHAGE.*

BY

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WITHIN the past few years the number of pathological conditions known to be directly or indirectly due to variation in the secretion of the thyroid gland have become unbelievably large. It is, therefore, with some hesitation that I bring forward another not uncommon but important condition, which, I believe is occasionally due to a deficiency of the normal thyroid secretion; namely, uterine hemorrhage.

While, so far as I know it is a new therapeutic application of the thyroid substance, the foundation for its use has been laid, and it is surprising that clinicians have not realized its value in this condition.

The subject of uterine hemorrhage first attracted my attention in 1911, when I was called to see a woman because of persistent uterine bleeding and obtained the following history.

CASE I.—Mrs. L. W., aged thirty-six, married, two children, no miscarriages, always well until two years ago when she began to menstruate frequently, often being free from bleeding only one week in the month. Bleeding is usually slight but is occasionally profuse, especially so of late. She is very weak and unable to do

* Read before the Toledo Academy of Medicine, Feb. 18, 1916.

her house work, has backache, headache, shortness of breath, constipation and a variable appetite. Previous history negative.

She is a very small woman, under 5 feet in height, weight about 90 pounds, appears older than thirty-six, and is very anemic. Chest and abdomen negative. Vaginal examination shows the uterus normal in size, freely movable and not tender, cervix slightly lacerated; tubes and ovaries appear to be normal and not tender. Curetment was done and the scrapings examined and reported negative by the pathologist. Hemorrhage did not cease and despite rest, packs, general treatment and the use of ergot, styptol and the like it became more profuse.

Finally in November, 1911, I took the patient to a very prominent surgeon in Chicago who after examination advised an hysterectomy. This was done and the report by the pathologist showed a normal uterus and tubes and one small cyst of the left ovary. In other words there did not appear to be sufficient pathology locally to account for the severe bleeding, which had persisted for over two years, despite all treatment.

Hysterectomy in such a case seemed to me to be an unnecessarily radical operation. It set me to think of possible factors not connected anatomically with the pelvic organs as a possible cause of this type of hemorrhage.

While this was still fresh in my mind I was called to see a similar case.

CASE II.—Mrs. L. D., thirty-eight years old, married fifteen years, never pregnant.

For the past six months she has bled continuously from the uterus, rarely profusely but sufficient to completely exhaust her so that now she is unable to walk across the floor unaided.

She has been under the care of several physicians and one very competent surgeon, but had refused all operative procedures, even the use of the therapeutic curet.

She was a very emaciated woman, hair snow white, face shrivelled like a woman of seventy; general examination negative except for the marked emaciation. Pelvic examination showed a very small, almost infantile uterus, the cervix intact, no pelvic mass, and the tubes and ovaries appear to be normal.

No cause for such persistent bleeding could be determined. Case I was still fresh on my mind, and too, I had been looking over considerable literature on the ductless glands in preparation for a lecture. An article by Sehrt (*München. med. Wochenschr.* 1911, vol. lx, p. 661) came forcibly to my mind. He had demonstrated the marked alteration of the coagulability of the blood in cases of hypothyroidism. He stated his conviction that certain cases of hemophilia were in reality cases of hypothyroidism or myxedema. In twenty cases of pure hemorrhagic disease of the uterus he found thyroid deficiency in thirteen. Despite this he does not mention the therapeutic use of the gland in these cases.

With this article in mind I examined the neck and found no evi-

dence of the thyroid gland, it had apparently completely atrophied.

Because of this fact and because all local methods of treatment had been tried and operative treatment refused I felt justified in making a trial of thyroid gland in this case. The patient was put upon three 5-grain tablets of the gland substance daily. I was surprised on the second day to find the patient brighter and more alert, her eyes were bright and her entire appearance was altered for the better, the bleeding was much less and by the following day had ceased entirely.

The dose was then reduced to two tablets daily for a week and stopped. Within three days the bleeding again started but stopped immediately after resuming two tablets a day. She continued with this dose together with iron, quinine and strychnine for three months at which time her regular menstrual periods were resumed. I heard from her last in December, 1912, one year after beginning the above treatment. She was then in good health and menstruating regularly. She was taking one tablet daily.

The prompt relief following the exhibition of thyroid gland tablets after the hemorrhage had persisted for a period of six months, its prompt reappearance upon stopping the tablets and ceasing upon again resuming this therapy, together with the subsequent history of the patient, leaves little room for doubt that the administration of the thyroid gland by mouth furnished the patient with something which was lacking in her body and the lack of which was directly or indirectly responsible for the bleeding from the uterus.

Since that time I have had a number of similar cases which I will report briefly.

CASE III.—Mrs. L. K., thirty-five years old, married, has five children. I saw patient in November, 1914, and learned that she had been flowing steadily since September. She had always been regular. Her last two pregnancies are of interest and I believe bear on this subject. During both of these pregnancies she was practically confined to her bed throughout the entire period and under the care of an obstetrician and an internist. From what I could learn the condition was thought probably to be hysteria.

She went to term each time but was constantly prostrated, nauseated and generally ill.

Examination showed a thin, tall, rather scrawny type of woman, looking much older than thirty-five, thyroid gland not palpable. Chest and abdomen negative, pelvic examination showed a sub-involuted uterus, soft and regular in outline, not tender, the cervix eroded but not ulcerated. Tubes and ovaries not palpable; no tenderness or masses could be determined.

A trial of thyroid gland tablets was made, giving two tablets daily. The bleeding ceased in thirty-six hours. Despite instruction to continue the tablets the patient stopped them, when the bleeding promptly began again but stopped the next day after again taking the tablets. After two weeks the tablets were gradually withdrawn.

There has been no return of the bleeding to this date, a period of over one year and a half. A notable fact in this case was, the patient volunteered the statement that she felt better and stronger than she had for years. She had undoubtedly been suffering from slight chronic hypothyroidism, and I feel that her condition during the last two pregnancies might well have been due to this lack of thyroid secretion.

CASE IV.—Mrs. E. S., aged thirty. Saw patient on July 19, 1914, because of severe bleeding from the uterus. She was five months pregnant, and an examination showed that abortion was inevitable. She delivered herself in three hours. Fetus and placenta came away intact. She had spotted since the onset of the pregnancy and for a time an ectopic pregnancy had been suspected.

Three months later she returned complaining of a very profuse menstruation, lasting eight and ten days. Her periods had for years been quite profuse but not as profuse as now. She was put upon two thyroid tablets daily, beginning two days before the period and continuing through the period.

Her next period lasted four days and the quantity of blood lost was much less than for years past. She has continued taking the tablets at each period with equally good results.

Here again it is possible that a deficiency in the normal thyroid secretion was responsible for the bleeding during the pregnancy and the subsequent abortion. It has been shown that goats after removal of the thyroid gland may become pregnant but invariably bleeding and abortion occur. I believe we have here a fruitful field of investigation for those doing obstetrics.

CASE V.—Mrs. C. S., thirty-six years old, widow, has one child seventeen, no other children. For the past year and half she has menstruated every two weeks, and usually more profusely than formerly. She is tired constantly and as she earns a livelihood as a clerk in a store and in addition takes care of her home, she is fast going down hill physically.

She is a strongly built, apparently healthy woman, with no organic lesions in chest or abdomen. Pelvic examination also fails to reveal anything pathological. The patient was therefore put upon thyroid tablets. She began immediately after a bleeding period and went along twenty-four days before the next menstruation appeared. She was put upon iron and arsenic. Her normal strength and health soon returned and by continuing with one tablet daily her normal periods were reestablished.

CASE VI.—Miss J. R., nurse, forty-six years old, complains of dizziness and pains about the ears, headache and general malaise. Her menstrual periods are gradually becoming longer and more profuse. She is gaining in weight rapidly.

Examination revealed a peculiar thickening about the skin of the face and body which does not pit upon pressure. No edema about the eyelids. Lungs negative. Heart slightly enlarged to the left, tones soft but no murmurs present. After slight exercise a slight

systolic blow at the apex can be heard, and the pulse is rapid and slightly irregular.

Abdomen negative. Urine negative and blood pressure 130 systolic; 70 diastolic. Pelvic examination negative. A diagnosis of myxedema and myocarditis was made, and the patient was put upon tincture of digitalis and three tablets of thyroid gland daily. The next period which began four days later was slight and lasted four days. The patient soon felt stronger and better and the peculiar thickening became less noticeable. By continuing with one tablet daily and two during the menstrual periods, they have become normal and the patient feels better in every way than she has for some time.

These cases of uterine hemorrhage are not uncommon, and the instances reported represent the various types that I have seen.

Suggestions hinting at the value of the thyroid substance in these cases are not wanting, but except for one case reported by Dr. G. H. Mallet (*Jour. A. M. A.*, Nov., 1897). I have been unable to find any report of its actual use.

Sehrts' cases quoted above would certainly suggest a trial of this treatment. Dudley (*Principles of Gynecology*, 1904), classifies unknown hemorrhages from the uterus, into hemorrhage of puberty and of the menopause, and states that it is at these times that disturbances are apt to be found in the thyroid gland. However, he makes no mention of having used the gland substance in clinical cases.

Falta in his recent book on Diseases of the Ductless Glands, on page 118 states: "Chronic benign hypothyroidism is accompanied by disturbances of sleep, lassitude especially in the morning and menstrual disturbances, especially menorrhagia and amenorrhea." Most of the books on gynecology make brief mention of the fact that excessive bleeding may be due to disturbed thyroid secretion. The reference is too brief to be of any value.

Most cases of uterine hemorrhage can undoubtedly be accounted for by some local pathologic condition such as infected endometrium, retained placental tissue, fibroid tumors of the uterus, uterine cancer or polyp, ovarian tumors or cysts, or diseased tubes.

However, there is a certain proportion of cases that cannot be accounted for by any of these conditions and in which any and all methods of treatment will not bring results. Every surgeon of large experience has at some time done a hysterectomy on one of these cases, as a life-saving measure.

The blood coming from the uterus in these cases is noncoagulable, this being a distinguishing characteristic. The fact that menstrual blood is noncoagulable would point to the fact that menstrea-

tion is controlled by the secretion of a substance which inhibits coagulation.

This has been conclusively shown to be the case by Sturmdorf in an article (*Jour. A. M. A.*, Feb. 14, 1914), entitled "Functional Menorrhagia." He deplores the frequent and unnecessary use of the curet and the removal of the pelvic organs in these cases. I quote from his article.

"It must suffice here to state that the endometrium during menstruation and in the hemorrhagic cases receives normal coagulable blood from the general circulation and sheds this blood in a non-coagulable state. This loss of coagulability is not due to the absence or deterioration of any element essential to the coagulation, but to the presence of an inhibiting substance that is periodically secreted by the corporeal endometrium from which it may be expressed. Such expressed endometrial juice is capable of inhibiting in any normal blood."

"The endometrium is activated to the secretion of this inhibiting substance by a hormone generated in the Graffian follicle. To the present time we have not succeeded in isolating this substance, nor have we discovered its specific antagonist. We have, however, learned to circumvent it by effectual measures."

The measures referred to by Sturmdorf are the use of vaso-dilators, and the local application of acetone, liquor formaldehyde, and the D'Arsonal spark, the treatment to extend over a period of several months.

There can be no denial of the fact that a treatment which works blindly and must be carried over a period of several months is not an ideal one for such a serious condition as hemorrhage, even though it be successful in the end.

We can scarcely hope or expect that such local methods of treatment will replace or even activate the formation of the anti-inhibiting substance, which depends upon or is controlled by a hormone formed in another part of the body.

From the clinical results in the cases reported above I feel that the thyroid gland is in some way responsible for the deficiency of the specific antagonist to the inhibiting substance referred to by Sturmdorf.

Whether this substance is directly elaborated by the thyroid gland or by one of the other of the ductless glands which depends upon the thyroid for stimulation, I am not in a position to state. However, our knowledge of the inter-relationship of the ductless glands would lead us to suppose that the thyroid gland is directly at fault.

In conclusion I would like to state the following:

There is a type of hemorrhage from the uterus not caused by any discernable pelvic disease or pathology, nor related to any of the so-called hemorrhage states, but due to an alteration or lack of one or more of the hormones which control the normal flow of blood from the uterus.

This alteration is due to a deficiency in the secretion of the thyroid gland, and such hemorrhage can therefore be controlled by a judicious exhibition of the dried glandular thyroid substance.

Finally I would caution against the indiscriminate use of this substance. It must be used only when the diagnosis is assured, for bleeding may occur in cases of hyperthyroidism.

Much harm might be done if given such a case.

234 MICHIGAN STREET.

REPORT OF A CASE OF CHOLELITHIASIS COMPLICATING PREGNANCY.

BY

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CHOLELITHIASIS, quoting Osler(1), is an exceedingly common condition, being found at necropsy in from 5 to 10 per cent. of subjects dead from all causes. It occurs at all ages but the incidence increases progressively with advancing age,—75 per cent. or more of the cases are found in persons over forty years of age and less than 1 per cent. in those under twenty. Rarely, the disorder is encountered in infancy or childhood. The majority of cases found in infancy are doubtless due to intrauterine infection. Gall-stones are more common in women than men.

Gall-stones are especially common in those who lead a sedentary life as contrasted with laborers and others who work much outdoors, in woman as contrasted with man, etc.; as part of a general muscular inactivity, the abdominal muscles and the diaphragm contract feebly and the bile, inefficiently expelled, stagnates in the gall-bladder. Similar consequences ensue upon obesity and disorders which interfere with the free movement of the diaphragm.

In women a number of factors contribute: in addition to a more sedentary life, they are more often the subject of hepatoptosis or nephroptosis, brought on by repeated pregnancies and other factors that occasion more or less continuous distention of the abdomen and interfere with the movements of the diaphragm.

In consequence of the prolapse of the liver, the gall-bladder becomes dependent and the cystic or common bile duct kinked, or perhaps has considerable traction brought to bear upon it and becomes obstructed, so that the gall-bladder is less easily emptied than in health and is more disposed to infection. The association of cholelithiasis with pregnancy is undeniable, but its importance is difficult to estimate, since the great majority of middle-aged women, whether or not they suffer from gall-stones, have been pregnant. There is some evidence, however, that gall-stones are more common in those who have been pregnant, especially repeatedly pregnant, than in those who were never pregnant. Perhaps in some cases puerperal infections are the cause of gall-stones. Sometimes the biliary infection, though often misinterpreted, can be definitely determined to have been acquired during the puerperium. No doubt the beginning of the gall-stones in case cited by Rufus B. Hall(2) at American Association of Obstetricians and Gynecologists September, 1915, started from the puerperal infection. Osler(3) quoting Naunyn states that 90 per cent. of women with gall-stones have borne children.

DeLee(4) says that it seems pregnancy is a factor in the development of gall-stones and it is not rare that the gravida have attacks of biliary colic. These seldom occur before the fifth month and jaundice with chills and fever is more common than in the non-pregnant state. Berkeley and Bonney(5) claim that in 30 per cent. of the cases, the attack occurs in the first five months of pregnancy. Cholecystitis is easily mistaken for appendicitis and pyelitis.

AUTHOR'S CASE.

History.—Female twenty-seven, American, housewife. Delivered of a male child three years ago. Patient seen for first time December 7, 1914. She was bleeding from vagina and passing clots. Vaginal examination showed a rectocele and a poorly repaired perineum—no muscle in perineum and was full of pin-point holes from the skin into the vagina. It was like a sieve. Patient had a perineorrhaphy following labor and a secondary perineorrhaphy the following year by the same physician with the above result. Found uterus prolapsed into vagina, cervix patent and easily dilatable and vagina full of clots. Diagnosis: Inevitable abortion. Manual delivery of a fetus—size $3\frac{1}{2}$ months. Patient up and about in ten days.

January 12, 1915, operated on by Dr. Ross McPherson assisted by Dr. Finkelstone. Dilatation of cervix, perineorrhaphy, appendectomy and suspension of uterus was done. Jan. 14, had a calomel run which "distressed" her very much—did not know patient had an idiosyncrasy to calomel, which gives her a marked gastric disturbance. Menses on Jan. 17. Allowed to sit up in bed with a

back-rest, Jan. 18, for two hours after which she complained of "aching pain throughout the chest." Vomited about 5 oz. of fairly well digested food at 8 P. M. Morph. sulph. gr. $\frac{1}{4}$ did not stop pain. Temperature 98°; pulse 86; respiration 22 January 19. In morning vomited 4 oz. of thick brown fluid—particles of undigested food. Sutures removed. Complained of same "aching pain throughout chest," relieved at times by belching. Urine examination negative.

January 20, complained of pain at upper right side of incision. Temperature 100; pulse 100; respiration 22. Blood examination: W. B. C. 6000; P. 80; L. M. 15; S. M. 5; E. O. B. O. Patient not jaundiced. Diagnosis: Cholecystitis (due either to lighting up of an old lesion in gall-bladder from gall-stones, calomel idiosyncrasy or following an appendectomy. In those cases following an appendectomy, the gall-bladder was no doubt involved at some previous time). Patient denies former gall-bladder attacks or even gastric disturbances—although she does say that ten years ago she had typhoid-malaria (?) and that she was "always taking calomel and quinine to drive away malaria." Patient seen in consultation by Dr. Ross McPherson in the evening, who concurred in the diagnosis of cholecystitis.

Pain somewhat relieved by hot flaxseed poultice and became less severe until January 24, when there was slight pain in the upper region of the wound for about five minutes.

January 26, 7.00 A. M. another severe attack of pain. About 6.00 P. M. vomited undigested food and pain was relieved.

January 28, patient up in a chair. Had slight lumbar pain.

February 8, discharged in good condition—wound healed by first intention.

April 1, röntgenogram by Dr. McKee showed dilated duodenum. Diagnosis: adhesions around gall-bladder or gall-stones, though picture showed no stones.

Recourse to x-ray is seldom of much diagnostic utility since cholesterin stones show scarcely any shadow, usually not more than the adjacent liver, though Cole(6) says biliary calculi can be detected in 50 per cent. of the cases by röntgenograms. In another article(7) he writes that gall-stones may be detected sufficiently often to justify a röntgenographic search for them, but the absence of any direct evidence does not justify one in making a negative diagnosis, and should not prevent surgical intervention provided it is clearly indicated by the history.

April 8, 1915, saw patient for amenorrhea. Last menses March 5, 1915. Vaginal examination negative. Could not find Ladinski's sign of early pregnancy due perhaps to unfamiliarity with sign. From history made diagnosis of suspected pregnancy. Considered an interruption of pregnancy on account of gall-bladder condition plus the suspended uterus based on Kosmak's views(8). Kosmak says that a patient with a suspended uterus is liable to difficult or

abnormal labor. McPherson advised that pregnancy not be interrupted as he claimed that in his own cases of Giliam suspension, his observations were at variance with Kosmak's. In fact he claimed that in his experience quite often soon after a Giliam was done, the patient became pregnant.

On May 15, diagnosis of pregnancy confirmed on vaginal examination. May 16, patient had slight attack of gall-stone colic. June 8, another attack of cholecystitis. Pain continued three days—at no time was jaundice present. Tried all recognized medical treatment with no relief. July 20, another attack of gall-stone colic. August 24, another attack of pain in right epigastrium which $\frac{1}{2}$ gr. doses of morphine did not relieve. Saw patient daily until Sept. 2, when writer threatened to withdraw from case unless patient consented to operation as he feared making an habitue of patient since she had received $\frac{1}{2}$ to 1 gr. doses of morphine daily since August 24, with an addition of 10 min. of Magendie's sol. once or twice daily. (Magendie's sol. seemed to have better effect than morphine sulphate.) Besides with such great amount of narcotic, the effect on the fetus had to be considered.

Evidently the fetus in early pregnancy can withstand more narcotic than the full-termed child or else the placenta does not transmit the drug in early pregnancy as readily, which makes one wonder whether it is not scopolamine that gives the untoward action in so-called "Twilight Sleep," or the effect of morphine in combination with scopolamine. Editorial in *Jour. Amer. Med. Ass'n.*(9) shows that, according to H. G. Barbour and N. H. Copenhaver, studies of the combined action of these drugs on the central nervous system exhibits a true synergism; *i.e.*, the narcotic effect of the combination has appeared more profound than the algebraic sum of the effects of the same doses given separately. Barbour claims in the case of direct action of these drugs on an isolated uterus, no synergism or antagonism has been discovered. M. I. Smith(10) says that the toxicity of the scopolamine-morphine combination in the mouse is increased with the relative increase of the scopolamine content of the combined dose. The fetus in utero may survive despite the fact that large doses of morphine are taken into the mother's circulation (Sajous)(11).

In August, 1915, patient seen by Dr. Howard Lilienthal, who advised an immediate operation to relieve symptoms by incising and draining gall-bladder and keeping fistula open, followed by a cholecystectomy after labor. Patient and family refused operation fearing it might interrupt pregnancy.

Various authorities claim that it is better to wait until after delivery for operation if possible, but in the presence of a strict indication, one may have to drain the sac before labor. Ross

McPherson declared that cholecystostomy was no more liable to produce abortion than any other abdominal operation in which the uterus was not much disturbed. Berkeley and Bonney(5) say that the coincidence of the symptoms and signs of gall-stones and pregnancy does not alter the recognized treatment of the former except in the latter month or two when owing to the diminished accessibility of the gall-bladder by reason of the intestine being crowded into the upper abdomen it is advisable to postpone any operation until after term unless the condition is urgent. They continue by saying that the operation has no particular tendency to cause miscarriage or premature labor, but if the child is just approaching the period of viability the operation should be postponed for a short time, if possible, in its interest. The operative mortality is returned in pregnancy as 13 per cent. and the puerperium as 10 per cent. in the latter operation. The later the operation, the more difficult it is technically due to the large uterine tumor. Only that operation should be done which will quickest remove dangerous conditions (Peterson). Operation should be postponed, if possible, until after delivery, at least as late in pregnancy as possible because premature labor may occur and the child be lost (DeLee)(4).

September 2, patient consented to operation. September 3, cholecystostomy done by Dr. P. W. Bill assisted by B. B. Finkelstone. Gall-bladder marsupialized and eighty-six gall-stones of small size removed. Patient discharged in twenty-one days; fistula healed in twenty-four days. Allowed fistula to close as gall-bladder wall at examination seemed in good condition. It also seemed that the symptoms would clear up. That it might have been better to allow it to remain open, only the future would show. Urine negative. Stools never clay-colored since patient came under my care. As far as could be ascertained at that time, patient had made a complete and uneventful recovery, wound being healed by first intention except where drain was inserted. Abdomen shows a fetus nearly seven months in L. O. A. position. Fetal heart 124. November 12, patient examined shows nine months pregnancy L. O. A. Fetal pulse 128. Urine negative for sugar, albumen and bile. December 1, urine negative.

December 11, 1915, patient in labor L. O. A. Fetal pulse 134. Delivered of a full-termed healthy male child. During second stage of labor when head was bulging perineum all of the vulva on the left side from perineum to near the clitoris was drawn over the child's head like a caul. It was impossible to push the labia on that side off of the head with the result that the head pushed through this obstacle as through wet paper, and the head, instead of being extruded through the normal vaginal orifice, came through this aperture tearing the left labium minus to the clitoris. With the

head came the posterior shoulder. The birth of the anterior shoulder was prevented by the separated labia blocking progress. This was incised to allow completion of labor. After placenta was delivered, trimmed off the posterior fragment of tissue as far as perineum, taking only skin and mucous membrane. Sutured the ant. flap; *i.e.*, the labium minus sinistrum in situ. Patient had a mucous tear of perineum which was repaired. Un-eventful recovery for mother and child. Vaginal examination tenth day showed perineum intact and incised and sutured part of vulva intact—cervix one finger dilated, uterus free, movable and in good condition. Patient discharged apparently well.

The separation of the labium minus was due perhaps to a not easily dilatable vaginal orifice following the perineorrhaphy. Separation of the labium minus is a rare condition. I have only seen one case before which occurred in an instrumental delivery. In spontaneous labor there is seldom more than slight abrasions on the inner surfaces of the labia minora (Williams 12).

Subsequent History.—January 8, 1916, called to see patient. Complained of slight pain in right epigastrium induced as her family thought by lifting her boy four years of age out of crib. Consultation with Dr. P. W. Bill. Diagnosis: torn adhesions in region of gall-bladder. January 9, slight pain just below the xiphoid. One A. M. January 10, patient in severe pain in same site, "felt as if it was boring through to the back." Diagnosis: cholecystitis. Pain was very severe and greater than before removal of gall-stones. Pain liable to occur at any time and generally a few hours after meals. Dr. J. C. Lynch saw patient in consultation and concurred in diagnosis of pylorospasm due to pericholecystitis.

January 12, roöntgenograms by Dr. W. A. LaField showed the following:

Stomach.—Normal as to size and relative position, the lowest point of the greater curvature is one inch above the umbilicus, the pylorus is to the right of the median line and four inches above the umbilicus. There is not any defect in the gastric outline. The peristaltic activity of the stomach is increased, suggesting duodenal irritation. At the end of six hours there is some residue.

Duodenum.—The duodenal cap is even in contour but considerably distended; the diameter of the full duodenum exceeds two inches. (Normally the duodenal cap is one inch to an inch and a quarter in diameter.) The duodenum is fixed in the upper right quadrant.

Intestine.—At the end of six hours the bismuth meal is scattered through the small intestine, the head of the bismuth mass being in the cecum. The motility of the intestine is normal.

Summary.—These findings contraindicate a gastric or duodenal ulcer; they do suggest the presence of periduodenal adhesions resulting from a cholecystitis with a resulting partial occlusion of the duodenum at the junction of the first and second portions."

This day pain was very severe. Morph. sulph. gr. $\frac{1}{2}$ to gr.

1 by mouth only gave slight relief. Patient seen on January 13, and advised removal to hospital to try to relieve pyloric spasms by rectal feeding and get patient in condition for a cholecystectomy. January 14, admitted to hospital—seen daily thereafter by Finkelstone with J. C. Lynch. January 14, seemed weak and pale, as she expressed it “washed out.” No jaundice present. Urine 10.30 negative except for bile. At 6:00 P. M. had severe abdominal pain and a mass was palpable at right side of gall-bladder scar. No doubt the gall-bladder filling up. Temperature 99; pulse 80; respiration 20. Diagnosis: cholecystitis. Pain continued daily at various times, lasting from a few seconds to an hour or more.

January 16, patient menstruating, which is quite unusual in a nursing mother less than five weeks following a labor. (This might tend to prove also that whenever the menses begin, they begin on the exact date of that month it might have occurred if pregnancy had not interrupted menstruation. According to patient's menstrual history 28-day type and last menses March 5, 1915, without an interruption of menses, the regular period would have been due on January 15, 1916.)

This day, 9:00 A. M., had slight “shooting pains across abdomen” lasting a few seconds. Had same pains at 1:45 P. M., 3:55 P. M., 4:00 P. M. and 5:35 P. M. Pain at 6:00 P. M. lasted a little longer. Slight shooting pain at 7:50 P. M. Slight continuous pain from 9:00 P. M. to midnight, at long intervals after midnight.

January 17, examination by Lynch and Finkelstone showed mass in right epigastrium was smaller, due perhaps to gall-bladder discharging its contents. Comfortable day—no pain. Saline enema at 1:00 P. M. returned yellow liquid with large amount of feces. Slept well. Baby put on artificial feeding.

January 19, temperature 97; pulse 68; respiration 20. Patient given mouth feeding for first time since admittance to hospital. Cubes of steak to chew but not swallow. Glucose per rectum continued. 3i doses of water occasionally. At night tap water compress to abdomen. At 9:45 to 10:00 P. M. slight shooting pain on left side of abdomen lasting about one second. Slept during the entire night.

January 22, mass again palpable. Most likely the gall-bladder filled up again. Slight pain in region of stomach extending through to the back at 3:45 P. M. Continued and more severe until 5:45 P. M. Relieved after hypo. of morphine. After saline enema, stools light brown liquid, large amount of feces.

January 26, 8:00 A. M. temperature 98; pulse 62; respiration 22. 4:00 P. M. temperature 88; pulse 70; respiration 20. Complained of slight burning in throat in A. M. 8:30 P. M. consultation by Drs. Ross McPherson, J. C. Lynch and Finkelstone. Patient considered in good physical condition for operation.

January 28, 8:00 A. M. during pain temperature 101; pulse 126; respiration 30. Severe pain in abdomen and back especially on right side near base of lung. Physical examination showed fine subcrepitant rales at base of right lung. Patient has a septic sore throat. Diagnosis: diaphragmatic pleurisy. Coughs and expect-

torates very frequently after 4:00 P. M. Vomited 3iii of brown fluid having odor like beef-juice at 7:45 P. M. Patient delirious at times during the night. 9:30 P. M. temperature 107; pulse 126. Vomited 3iii dark brown fluid at 12:30 A. M. and 3:00 A. M. Defecation—large amount of clay-colored feces—for first time since patient has been under observation. Complained of feeling cold, but did not have a chill. Fairly comfortable night. Slept at long intervals. Operation postponed on account of patient's present condition.

January 29, 1916, 8:00 A. M. temperature 103; pulse 120; respiration 36. Extremities cold and clammy. Very drowsy. No pain but an indescribable feeling. Perspired freely. Patient slightly jaundiced. Finger nails somewhat jaundiced; under tongue shows marked jaundice. (This is the first time patient was ever jaundiced.) At 1:00 P. M. vomited medication, a fever mixture, immediately after taking. Vomit showed large amount of brown and green particles, also a soft faceted gall-stone about $\frac{3}{8}$ inch in diameter, which was easily broken. Slight cough and mucous expectoration. 3:00 P. M. temperature 100; pulse 100; respiration 26. Cheeks flushed. Respiration while sleeping 24-30. Slept greater part of day and night up to midnight. Then had dry retching which lasted 10 minutes, and vomited 3iii of greenish fluid. Complained of pain in left side of chest and abdomen.

January 24, mass still easily palpable. "Heavy weight" with slight pain in region of stomach at 1:45 P. M. Continued and gradually became more severe until 2:45 P. M. Temperature 99.8; pulse 90; respiration 20 during pain.

January 30, 9:00 A. M. temperature 100; pulse 98; respiration 20. Throat improving. Pain in side of abdomen and chest less. Slight red vaginal discharge—no clots—not the period for menses. Examination shows blood coming from uterus, due perhaps to bile in the blood. No examination of blood made for bile; at night some pain left side of abdomen on inspiration. Restless and unable to sleep.

January 31, jaundice entirely disappeared. Complained of some abdominal pain. Slept fairly well without an anodyne.

February 2, slight nose-bleed. Vaginal discharge slightly red. Slept fairly well. In fact patient seemed to improve rapidly since vomiting the gall-stone. Abdominal pain at rare times.

February 5, bowels moved well—very dark green, semiformed. Slight nose-bleed, also on February 6. Unusual for patient to have nose-bleed.

February 7, temperature 98; pulse 80; respiration 20. Patient up in chair for one hour. Discharged from the hospital February 11, in good physical condition.

February 12, examined by Dr. Howard Lilienthal. Operated upon by Dr. Lilienthal on February 15. Exploration shows a hard pancreas, evidently chronic pancreatitis and an enlarged gall-bladder. Mayo(14) states that in 2600 operations on the gall-bladder and biliary ducts, the pancreas was found coincidentally affected 141 times (6.1 per cent.). Infection generally spreads to the pancreatic

ducts especially the head, which may become so hard as to suggest carcinoma; later the organ becomes contracted and fibrosed (interstitial pancreatitis). In some cases, pancreatic lithiasis also occurs (Osler). According to J. B. McKenna, (15) the Mayos found the pancreas involved in 60 per cent. of all their operations in the gall-tracts. They also state that 81 per cent. of pancreatic diseases is the result of, or coincident with, gall-stones. Egdohl says cholelithiasis is the most frequent single cause. Robson found the pancreas involved in 60 per cent. of cases in which gall-stones were in the common duct. In the Mayos' experience it was found that pancreatitis was four times as frequent when the stones were in the common duct as when they existed in the gall-bladder.

Adhesions broken up. Cholecystectomy done and the duodenum drained. On examination, the gall-bladder was thickened and imbedded in the inner wall of the gall-bladder neck, near the duct was a stone about the size of a bird seed. There was no gastrocystic fistula so the stone must have gone in through the pylorus (Lilienthal).

Sajous (13) writes "Calculi have been expelled from the stomach which either found their way to the stomach into the viscus directly, or as is more commonly the case, have been regurgitated from the duodenum."

RECAPITULATION.

This case presents many points of interest. For nearly a year with marked symptoms of cholecystitis and cholelithiasis, patient showed no jaundice, no gray stools, no fever up to the time of subsequent history. The rise in temperature was due to septic sore throat and diaphragmatic pleurisy. At no time even during or after a gall-bladder colic did temperature vary more than one degree. That it was good judgment in not interrupting the pregnancy on account of suspension was proven as during pregnancy there were no symptoms due to adhesions and after labor the uterus was found freely movable; that morphine in large doses given for pain does not apparently affect the fetus *in utero* as child at birth was considered healthy and has continued so up to the present time, notwithstanding the artificial feeding since the fifth week of birth. The character of labial tear is quite rare. Vomiting of a gall-stone is a very rare condition, especially without a fistula, leading into the gastro-intestinal tract from the gall-bladder.

It hardly seemed a mistake at the time when the fistula was allowed to close up, for except for the gall-stones being present, the gall-bladder seemed perfectly healthy, and perhaps no need of a secondary operation. It must always be taken into consideration that infection can be transmitted into the gall-bladder through

fistula from without. From very limited observation, I agree with various authorities that no gall-bladder is healthy that does or ever did contain gall-stones. It is diseased from the fact that it contained stones.

It hardly seems probable, though possible, that the stone had formed in the interim between both operations on the gall-bladder, but regardless of whether it had or had not, if the fistula had been allowed to remain patent, as Lilienthal had recommended, perhaps the marked pain due to pylorospasm might have been avoided, as the vomiting of the gall-stone seemed to relieve the condition. Though it might be possible that it was the pericholecystitis causing the spasms and that, the presence of such a small stone had nothing to do with the condition. Rectal feeding had a minor rôle in the relief of the pyloric spasms.

L. W. Swope(16) in a paper read at *Amer. Ass'n of Obstet. and Gyn.*, Sept., 1915, says that at all times it is advisable, if possible, to do a cholecystectomy instead of a cholecystostomy. He states that no absolute rule can be laid down to guide the operator in determining when cholecystectomy is preferable to cholecystostomy. In 2600 cases in which he operated in upper abdomen where there was, primarily or secondarily, any implication of the gall-bladder and the bile-ducts, later reports of the recovered showed 96.8 per cent. of cures; the remainder suffered from symptoms probably indicative of associated gastric or pancreatic disease. In cases of cholecystostomy there were only 74.8 per cent. of cures, the remainder being no better, and many of them worse, than before the operation. The mortality in cholecystectomy as compared to cholecystostomy is only slightly higher, *i.e.*, a fraction of 1 per cent. he claims.

The finding of a chronic pancreatitis is nothing unusual and it ought not to lead one to error if on exploration to the touch the pancreas feels hard, as Lilienthal expresses it, "as hard as nails," to make an incorrect diagnosis, *viz.*:—carcinoma of the pancreas.

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- 346 STATE STREET.

A LEATHER-BOTTLE DESCENDING COLON, SIGMOID AND RECTUM.*

BY

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THE purpose of this paper is the report of a relatively unusual case of fibrous colitis. I am indebted to Dr. Alfred Stengel and his staff at the University Hospital for permission to use the case.

The clinical history states Mrs. C. O., white, aged fifty-eight, was admitted Nov. 7, 1914, and died Feb. 2, 1915. The patient was a widow and her chief complaint was "bowel trouble." She had typhoid fever twenty-three years ago and has had ten children six of whom are living. For the past ten years she had incontinence of feces progressively more troublesome and for the past year she had not been able to leave the house. The movements occurred at any time without her knowledge. Her appetite was poor, she suffered no abdominal pain, no vomiting but gaseous eructations were large and sour. For three weeks before admission she had fever and was confined to bed with yellowish and profuse movements.

Upon examination the patient was an elderly, extremely emaciated female. A soft systolic murmur was heard transmitted to the axilla. The abdomen was flat and relaxed, with wide diastasis of the recti and visible aortic pulsations. The urine showed a cloud of albumin and no casts. The feces were dark, brown, foul and liquid with bile, fat, casein, mucus and no occult blood. The Widal was posi-

* From the McManes Laboratory of Pathology of the University of Pennsylvania, Philadelphia, Pa.

tive. The blood culture was sterile and the Wassermann was negative. The urine culture was negative for typhoid bacillus and the feces were negative for ova and tubercle bacillus. Introduction of the finger at the rectal examination gave considerable pain. The patient's niece stated that the incontinence followed the birth of the last child the result of a complete tear for which she refused operation.

During the course of the case the patient was put on many diets none of which seemed to agree. There was some delirium, vomiting and fever continued. A proctoscopic examination showed externally an old vaginal tear which evidently had involved the sphincter ani; the rectum was separated from the vagina by a thin septum of dense fibrous tissue. Through this 1 cm. above the external opening a rectovaginal fistula had resulted. About the anus four other distinct fistulae were seen two at least of which were complete. The entire sphincter ani was sclerotic, unelastic and had practically no tonus. The rectum presented with a thin, pale, smooth lining membrane. The appearance was not that of carcinoma but of a long-standing inflammation. The patient did not improve but slowly became weaker and died with failing heart and lungs full of rales.

The autopsy findings were briefly as follows: The body is that of an adult female weighing about 70 pounds. Emaciation is extreme and general. The skin is literally stretched like parchment over the chest and abdomen, the latter so flat that the iliac spines protrude like pegs. The abdominal cavity is free from fluid, the cecum is small, its diameter *in situ* being but 2 to 3 cm. Adhesions diffuse and band-like are present at the hepatic flexure and about the gall-bladder. The transverse colon has a midline ptosis of 15 cm. From the splenic flexure to the rectum there is considerable epiploic fat. The descending colon feels firm especially at the level of the lower pole of the kidney where there is a special thickening extending out into the perirenal fat. Upon incision the cecum and transverse colon have a thin mucosa, at the splenic flexure there are several small ulcerations and then sharply demarcated the descending colon changes to a picture which it presents uniformly to the rectum. This change is a loss of the mucosa which is replaced by a raised, firm, fibrous, ridged appearance not unlike the intimal surface of the aorta in advanced sclerosis.

Microscopically frozen and paraffin sections taken at different levels show a decided loss of mucosal epithelial elements with a progressive inflammatory process. This consists of a marked hyperplasia of round cells, fibroblasts and adult hyalinized connective tissue. This inflammatory condition is mainly present in the

mucosa and submucosa with extension into the muscular and subserous coats to a lesser degree. Where the denser mass was noted at the pole of the kidney the same fibrous inflammatory change has taken place. The appearance as a whole presents a striking resemblance to the leather-bottle stomach of the benign type. The other features of the autopsy are degenerative and atrophic in type. These involve the liver and kidneys with marked atrophy of the stomach, atrophy of the pancreas, brown atrophy of the stomach and atrophy and emphysema of the lung with terminal congestion and edema.

DISCUSSION.

This case presents a history of incontinence of feces of long duration dependant possibly upon typhoid fever but more probably upon a severe laceration of the perineum at childbirth. Toward the end she had the wasting and cachexia of malignant disease. In the absence of specific data it may be assumed that the condition started in the rectum as an acute traumatic colitis which progressed by extension ulceration until the entire descending colon was involved leaving a trail of fibrous organization behind. This resulted in denuding the terminal colon of epithelium and once its protective factors were removed a low grade of chronic inflammation continued. This no doubt allowed absorption of fecal toxins bacterial or otherwise with the resultant degenerations and atrophies.

The result of colectomy in this case can only be speculative but in the early or even moderately advanced stage it would seem that such an operation might be warranted.

PELVIC INFECTION FOLLOWING ABORTION. A CASE OF INTEREST.

BY

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THIS case, to me, presented features of unusual interest as a gynecologic study. The woman was about thirty years of age, and married. Several conceptions had occurred, but none had gone to full term, five months being the most advanced one, the others aborting at a few weeks. The patient, at the time of my visit to her home at the request of her physician, had been confined to her bed for eleven weeks following a supposed abortion. A satisfactory account of the thrown-off product could not be obtained, although the clinical history confirmed the diagnosis. There had been some slight chills, and the temperature was ranging from normal

to 100 and 101. The patient was much emaciated, because she could not take food and because of almost constant pain. The pain was entirely characteristic of pelvic pathology involving the procreative organs; viz., *recurrent, rhythmic, paroxysmal* and *expulsive*. During my visit a paroxysm occurred, and the woman gave evidence of much suffering. Vaginal examination revealed very little apart from the usual in such cases, a tender, fixed uterus; with palpable masses on both sides together with some tenderness, which was most marked on the left. Menstruation was recurring with regularity and was now about two weeks past; with a vaginal discharge in the interval. The case seemed to me, one whose best chance would come through surgery, and my advice to send her into the hospital met the approval of all concerned.

Just what an incision would reveal, was a matter of uncertainty, the three greatest possibilities being, either an ectopic, a dermoid cyst or immense pus tubes (and I say immense because the mass could be easily palpated through the abdominal wall), but the one certainty was infection, in either one or a blend of these possibilities, and deeming it unwise to invade this pathology in the midst of an active conflagration, the diet was confined to liquids, and the pelvis covered with ice. Within a week the patient was very comfortable, there was no recurrent pain, the tenderness from above was much less, the bowels were easily moved, the kidneys secreting well, the appetite good, while with 5 grains of veronal at bedtime, the patient was revelling in long nights of sleep; and last, if not least in importance, the temperature was normal. A hot bichloride douche, 1-10.000, had been given daily.

Such normal conditions existing for forty-eight hours, the case was deemed safe for operation, and posted for the following morning; but, during the night, the menstrual flow appeared, under seemingly normal conditions; and, acting upon the principle that has always governed me, in any case of the kind, and believing that surgical trauma to pelvic organs, in the midst of the congestion of a menstrual epoch, is not only unwarranted and unsafe, but discourteous as well, the operation was postponed until this period was past.

After three days of normal menstruation, with a normal rise of temperature under such conditions, the "flow" was over, and the patient again permitted a twenty-four-hour respite for reconstruction which was passed in perfect comfort, and with a normal temperature.

Again the time was set for operation, but to my consternation, upon taking a look at her chart on the following morning, there

was a record of a subnormal temperature, with abdominal pain, some nausea, and marked distention, these having appeared during the night. Upon making an examination of the patient, this report was not only confirmed, but the fact of a general, and active peritonitis fully established. Now, that an "accident" had occurred within the abdomen, was very evident, and also that the time for interference was not favorable equally so; therefore, the waiting plan, with restriction of about all else, was again established. For two days this picture was practically unchanged; but on the third, the temperature had regained the normal, distention and tenderness were less; the pulse, which had been very thready, again was fairly good, and it seemed to me that a day of this would justify at least an incision and drainage, a need of which was almost beyond a doubt. Therefore, on the following morning, under ether anesthesia, and through a median incision, the following pathology was established.

A general peritonitis, with agglutination of coils of intestine, as well as gentle adherence to abdominal peritoneum. Agglutination of all intestines to pelvic content, division of which, through a line of cleavage, revealed free pus everywhere, evidently the output of three nights previous, although its point of exit could not be determined. Hooding the uterus, and presenting well up above the pubic symphysis, were two immense pus sacs, which, upon careful examination, proved to be burnt-out craters, composed of ovarian wall, and containing a large quantity each, of mixed pus, for the odor was marked. Mixed pus in these cases accounts for the temperature curve. In the case of each organ, all ovarian stroma was gone, and nothing but a shell remained. The tubes were twined about these foci in their characteristic manner. All free pus was sponged from the cavity, and an enucleation of tubes and ovaries effected in as thorough a manner as was consistent with the vitality of the patient. Intestines were freed in the immediate vicinity, although it was not deemed wise to carry such invasion too far. The entire abdominal and pelvic cavities were flushed out with an abundance of normal saline solution, three deep drains carried down, one on either side, and one just above the fundus of the uterus, coming out at the lower angle of the incision, and closure effected to the point of their entrance. The reaction from the operation was really much better than might have been expected, considering the low vitality of the patient, and save for very uncomfortable distention from infective ileus which persisted for about four days, the post-operative history has not been unusual.

In retrospective view of the history of this case, as well as in its operative findings, some features, to me, are of much interest and value. Among them, a leading one is, "when to operate." Naturally, it has occurred to me that prompt exploration upon entering the hospital, might have prevented the subsequent occurrences, with their forbidding aspects; and yet, had this exploration been made, in the presence of active inflammatory conditions, and followed by a fatal result, I should have believed that I was to blame for the tragedy. Later, when menstrual function was established, the addition of surgical trauma, in the midst of the inevitable uterine congestion existing, must have done violence to my conscience. and to my sense of common courtesy as well.

Again, and of equal interest, both from a scientific and a practical viewpoint, let us remember that the ovaries, *both*, were spent craters; only shells of the organ remaining, with no chance for the perpetuation of productive function, or other controlling influence in the economy, and yet the cycle of menstruation had continued, with a fairly normal rhythm, and a fairly normal clinical history, thus establishing the fact, which it seems to me would be such a comfortable acceptance, that "the uterus is the organ of menstruation."

MATERNITY SUPERSTITIONS OF THE FILIPINOS.

BY

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SUPERSTITIONS are, of course, not peculiar to any one people or time. There are certain general superstitions which, in a slightly modified form, are practically of world-wide distribution; there are others peculiar to ages, times, and races; and there are still others peculiar to countries and localities.

In common with other countries, the Philippines has its share of medical superstitions and its own particular brands of magic for the cure of all ills. Being a young country with less experience in the customs of modern civilization, many of the superstitions are of very primitive character. Some of them are dangerous, but many of them are harmless, except where they interfere with the application of scientific methods in the relief of suffering.

During the last few years the more subtle methods now in vogue in older countries are being introduced, so that this is fast becoming

a fruitful field for patent medicines, pseudoscientists, cultists, and others who hold sway in other countries.

There is a belief among the Filipinos of the lower class that children become sick of fever as a result of extreme pleasure coming to some other person or when the child has been frightened by an animal. In order to discover the person or animal causing the disease, "tawas" is performed which consists in putting a piece of alum on the fire and the person or animal is guessed from the different figures formed by the smoke. If the disease is caused by a person, an invitation to call at the house of the sick child is made, and this person deposits a small amount of his saliva in the mouth of the child who then is rapidly restored to health. "Tawas" is practised rather extensively, and it is possible that it is means of transferring communicable diseases, such as tuberculosis and syphilis.

There is also a belief that eruptions, especially scabies, should not be cured, because if cured they may reappear in the internal organs.

In a certain district in Tayabas province, the people of the lower class believe that new-born babies should not be cured of illness for they are angels, and that if they become sick and die it is because God wants to keep them near Him.

Midwives in this locality believe that the fetus of the eleventh pregnancy attended by them should die, in order that they may be considered good midwives. "From this I infer", the physician making this report says, "that the majority of midwives, if not all, have committed infanticide which is, of course, a crime that should be prosecuted."

Recurrences of illness of any kind (binat) are prevented by burning fowl feathers beside the sick person.

One of the most extensive therapeutic customs in the Philippines is the so-called "buga" which consists of masticated herbs—frequently betel leaves, areca nut, lime—mixed with saliva; it is applied directly from the mouth to the different skin eruptions, such as, eczema, erysipelas, and impetigo, and especially those eruptions of serpiginous character which are called "abas" (snake). Children covered with scabies from head to foot sometimes die from septicemia in consequence of the practice of "buga."

In the provinces over 90 per cent. of all deaths occur without medical attendance; some people do not call a physician on account of being poor and unable to pay for his services, while the majority believe that medicines from drug stores are not suitable for them in view of the fact that they are being fed almost exclusively with vegetables, and for such there is no better remedy than the herbs

prescribed by "mediquillos" or by some neighbor. The "mediquillos" are trying for their own benefit to keep this belief alive among the common people. In most places in the Philippines, the "mediquillos" are more frequently called than the physicians, and sometimes they succeed in making small fortunes at the expense of ignorant people. They usually charge from 50 centavos to 2 pesos or more per visit, and they are frequently paid in palay, hens, eggs, fruit, etc.

There are many persons in Manila as well as in the provinces who die without medical attendance, but whose funerals are held with pomp and ostentation. If the family is out of money, their clothes, jewels, house, lands, or draft animals are pawned in order to get money to meet the expenses of the funeral and to celebrate a feast during nine consecutive days (diaruhan 6 bankayan) or only on the fourth day (apatang arao) or the ninth day (katapusan).

In Tayabas there are persons who have pawned their farms or their cocoanut plantations in order to secure money for the expenses of weddings, baptisms, or funerals. Sometimes they become unable to redeem their properties, and as a result they are compelled to become tenants instead of landlords.

It is a custom in the Philippines among the poor class to help the family when one of its members dies. The neighbors come to the house of the deceased and deposit in a dish, especially prepared for the occasion and placed near the cadaver, 10, 20, or 50 centavos, or more, according to the financial standing of the visitors, in order that the family may be able to pay funeral expenses. While the sick person is still alive, no one cares for him even if he has nothing with which to buy medicine or pay for the medical service. The kind feelings of the neighbors are only shown when a member of society has already disappeared and whose life might have been saved if the kind feelings of the relatives and neighbors had been shown in due time.

Superstitions regarding conception and childbirth are particularly common among the less educated people, in consequence of the superstitions many queer maternity practices are encountered.

The more usual superstitions and the faulty maternity customs as practised in most countries have been published and exposure of the irregularities has been an important factor in improving midwifery practices.

It is no reflection on the educated class of Filipinos to discuss the faulty and frequently dangerous customs of their own ignorant classes, which after all are no worse than those encountered in older

countries; and just as has happened elsewhere publicity should lead to better service for the poor.

Most of the irregular, dangerous and queer superstitions of the Filipinos have been published in various scientific journals and books. These publications have been consulted and freely quoted in this article.

Particular mention should be made of the exhaustive report of the Government Committee on Infant Mortality which acting under special law, with special appropriations and under the Chairmanship of Dr. Musgrave spent two years in accumulating data on all phases of infant mortality. One chapter of this book is devoted to "Medical Superstitions."

Dr. Rebecca Parish, Dr. F. Calderon, Dr. Acosta Sison, and others have published articles on this subject and extracts and quotations from these are freely used here.

Among the most common superstitions regarding pregnancy and childbirth are the following:

When a woman suffers from any disease during pregnancy or an accident takes place during labor, it is said "na amuyan" (she has been smelled). It is believed that there is an enormous animal whose sense of smell is so powerful that the odor of a pregnant woman is recognized by it at a long distance and that when such person is discovered by this animal she suffers death during pregnancy or during labor.

It is said that a pregnant woman must not stop at the door when she enters her own or another's house, otherwise the fetus will not come out when the time of delivery arrives; she must not lie down across the grain of the wood or bamboo forming the floor, because a transverse presentation of the fetus will be the result; that in cooking rice she must not scorch anything in the fire, in order to avoid bowel movement during labor; that wood must not be placed in the cooking stove top end first, so as to avoid breech presentation of the fetus; that she must not tie a handkerchief around her neck, in order to avoid twisting of the cord; and that she must not sew the clothes for her body, to avoid imperforated anus in the child.

To facilitate the expulsion of the placenta, a pot cover is placed on the head of the parturient; to restrain a puerperal hemorrhage, red silk is tied around the thumbs and big toes. Besides this, the midwives compel the parturient to assume a squatting position and a very strong knot of the hair is made, with the object, so they say, of preventing the blood from running toward the head.

Frequently during the months of gestation the ignorant woman's

peace of mind is constantly disturbed by the many superstitious beliefs that are recounted from generation to generation, and are steadfastly adhered to and heeded. The young women especially are in continual mental terror lest some of these things be violated, and the consequences are dreadful to contemplate.

If any one stands in the door in the presence of a pregnant woman it is a sure sign that at the time of her labor the child will also stop in the door of the uterus.

The prospective mother must not step over the tether of a pony, while out walking, or a difficult labor will surely result.

Very tight belts and strings, worn about the waist during pregnancy, will insure an easy delivery and will also prevent the child growing too large.

Many times the pregnant woman is forced to engage in the most arduous exercise, a favorite one being grinding rice; this causes an easy delivery and is certainly effectual, as the babe is sometimes born at the mill.

During the course of even a normal pregnancy it is necessary for the midwife to make frequent examinations, and not infrequently she considers it proper, to "change the position;" or "place the baby," and she receives 10 centavos for each such service.

Perhaps the most prevalent and terrifying of all the superstitions is concerning the "aswang," an imaginary being, half man and half beast; indeed, there are many "aswangs," and it is said that in Tayabas Province there was an entire family of beautiful girls, all of whom suddenly became "aswangs" one night. This creature prowls around at night and is the terror of the patient and all her relatives, because he watches to get the blood of the patient and to steal the child; and as he lives both in the air and upon the land, and is guided in his night depredations by a bat, it is next to impossible to feel free from him at any time. During the latter months of pregnancy it is necessary for the women to sleep under a black cover, so that the "aswang" cannot see her; and frequently there is a fire kept burning under the house, so that the smoke may keep him away. It is exceedingly dangerous to be out after dark, and if the woman does go out at this time it is necessary to wear the hair loose down the back, which is her protection against the "aswang" influencing her child and causing him also to be an "aswang."

As a rule, the Filipino woman is very indefinite as to the time when her pregnancy will terminate, and consequently she is rarely prepared for this event; however, very little preparation is required,

except the "midwife," who is considered quite sufficient for her needs, and in many instances she cannot afford this luxury. In some provinces, it is said that men act as assistants and are better for this purpose, as they are stronger and can apply more force in kneading, pressing, squeezing, pulling, and pushing, as all of these operations are considered essential. Short stout clubs, made of wood, stone, or burned clay, sold in the public markets, are used a great deal for pressing, pushing, and kneading, and are considered much more effectual for the purpose than is the hand.

To ease the labor pains, "bagabaga leaves" are burned near the patient, that she may get the odor. The waist is tied about tightly during labor, to make sure that the child passes downward instead of upward.

In some cases, the delivery of the placenta is awaited before the cord is cut, but if the placenta is not expelled within an hour, at least, it is pulled away by traction on the cord, and if this proves too difficult the cord is severed and the placenta is left in the uterus. Guava leaves soaked in warm oil and placed on the abdomen are said to aid in the expulsion of the retained placenta.

The placenta with a paper and pen, buried under the house, will insure a bright and intelligent child.

It is said that a soup made from small pieces of the placenta and given to the mother as her first postpartum nourishment, prevents fever, weakness, and other forms of illness.

The mother is given large quantities of rice and urged to eat, so that the abdomen will be filled, as it was so large before. The waist is tied after labor, to prevent the abdomen filling full of wind when the patient breathes deeply, and also to prevent the blood from coming up and out of the mouth. The bones of the sacroiliac joint are separated during labor; therefore a strong band is placed about the hips and tied tightly by two men, one bracing himself on either side, with his feet against the patient's body. Sutures are not required, because an external douche of an infusion of bayabas leaves will heal lacerations in three days. The patient's abdomen is rubbed with oil for twenty-five days, so the uterus will become soft and send out the blood, thereby becoming small. Hemorrhage is encouraged by propping the patient up with pillows (sometimes as many as seven); this also prevents the uterus going high in the abdomen, and causes the bad blood, which must be gotten rid of, to drain better. Frequently the patient is almost exsanguinated, and death from hemorrhage may occur without any effort being made to check the bleeding.

Sleep is not allowed, because it produces a tendency to insanity. Frequently the patient is allowed to sit up and even to stand, within a day or two after delivery. After-pains are greatly helped by the patient's getting the odor of burning deer skin. After three days, the procedure of "replacing the uterus" takes place. For nine days it is thought bad to eat salt or drink cold water. About the tenth day the woman is bathed with a little warm water, and smoked by having a mat enclosing her and a jar of burning leaves; following this, if there is a suspicion that the uterus is still 'raw', a fire is made of charcoal in a large earthen pot, and the patient stands astride this, surrounded by blankets and supported by her friends. It requires an hour of this treatment to cause the uterus to "dry-up."

For three months the woman should not put her hands in cold water, drink cold water, nor take a cold bath. This rule evidently does not apply to laundresses, whose occupation calls them to the river or spring.

No antiseptic precautions are known; old rags, old clothing, and the family bedding are used about the parturient.

Recently, I saw a woman who gave a history of eclampsia, with the following treatment: While she was unconscious she was placed in a sitting position on a red-hot stove; when she regained consciousness she was suffering from a severe burn, which produced extensive loss of tissue and scars larger than my two palms. It is said that this hot-stove treatment is quite common.

All sorts of superstitions are in vogue concerning the care of the infant; it must be guarded from the "aswang" and must be fed with curios concoctions. The cord is dressed with ashes, powdered cocoanut shell, or hot tallow. I saw one new-born child with many little cauterizations about the umbilicus, made with a hot bamboo, as a cure for convulsions.

In cases of continuous crying of the child, which is considered the premonitory symptoms of convulsions, a piece of alum is rubbed on the frontal region, on the palms of the hands, and on the abdomen. The alum is then burned, and they observe with attention the course of the smoke, from which they decide the kind of disease the child is suffering from. The carbonized alum is then dissolved in water, and a certain amount of it is administered to the child.

It is not the custom of the people to celebrate fiestas (nine days) when the dead person is a child under seven years of age, but from seven years and up it is considered an adult, and such nine days of fiestas are required.

The practice of the "intruders" in Tagalog provinces is different

from that used in Ilocano provinces. In the former, a solution of cogon roots is used as an oxytocic, and in many cases when the head of the fetus is noted in one side of the hypogastrium, which is the normal position, the pregnant woman is subjected to a method known as "buncal," which consists in changing the position of the fetus by placing the head in the median line. At the time of the childbirth, ordinarily an assistant known by the name of "salag" intervenes. The "salag" pulls on the fetus to facilitate its expulsion, and this person may be a man or woman. The result of this practice is in many cases, the laceration of the perineum.

If the expulsion of the fetus is not obtained by means of "salag," the parturient is put in a sitting position on the edge of a chair and then the perineum is compressed, after which the parturient is again placed on the bed.

Obstetrical complications, such as eclampsia and puerperal mania, are attributed to the "aswang," and evil spirit, and to the "mangkukulam," a witch, said by superstitious persons to be the torment of parturient women.

In cases of puerperal hemorrhages, the intruders order that pieces of bamboo be burned under the house, in order to keep the parturient warm; and in one known case the house caught fire as a result of this practice.

After childbirth a tight band is put around the waist, then compression is made by two persons, one sitting on each side of the parturient and pulling on the ends of the band, it is said, to close the genital line. This practice is known as "el sara."

It is believed that a person who menstruates must not stand on a mat of the parturient, because it causes colic to the sick woman, and that a person standing by the door of a house prevents the expulsion of the fetus.

Massage lasts eight days, at least, in the case of the mother, and is so strongly made that the patient suffers a great deal, weakening her unnecessarily.

Hemorrhages and septicemia are frequent complications in the provinces, and prolapsus is produced by untimely massages.

The parturient must not take a bath before thirty days, which is the puerperal period to them.

The "saclap" is seldom used by the Tagalogs, but hot baths are frequently used.

After birth the child is washed in lukewarm water; some use cocoanut oil instead of lukewarm water to clean the grease away.

The children are not fed during the first three days, but a purgative

of castor oil is given, pure or mixed with "jarabe de ruibarbo," or "achicorias" (10 grams daily of the mixture), and after ten days the purgative is again given, but the dose is increased. After the three days of purgative, maternal or artificial feeding is given and continued irregularly until the age of six months, when cooked rice or any other available food is substituted. Young children receive the treatment of "mainit," which consists of hot applications to the scrotum and umbilicus.

The Ilocana woman takes a bath immediately after childbirth and during sixteen consecutive days. Immediately after bathing, she stays for the whole day beside a hot stove, in order to heat the pelvic regions. The "mainit" in this case consists of a piece of clothing moistened with alcohol, which is placed over the perineum and tied around the waist. This is called "bahag." The "saclap" consists of a receptacle with burning charcoal, on top of which is placed a kitchen utensil known as "diquin," over which the parturient is put. This is not practised in bad weather.

In addition to the loss of life due to incapability of delivery on the part of the mothers, children attended by these midwives usually die, either at the time or after the childbirth, the cause being the untimely purgative and awful treatments to which they are subjected. Plenty of purgative, massage, "amorgoso" juice, and "upus" plaster constitute the therapeutic measures of these intruders.

In cases of apparent death of children when they are delivered, the umbilical cord is squeezed from the placental juncture to the abdomen, and then the placenta is burned. Sometimes the index-finger is introduced into the infant's mouth and strong pressure over the palate is made to open the nasal fossæ.

When a child is born face downward, another operation known in tagalog as "boyon boyon" is made, the purpose of which is to induce the expulsion of excrement of greenish color, known as "sawan" in tagalog and "calamayu" in Bicol, which is, so they say, the cause of convulsions. The operation is made in the following form: The hands and feet of the child, joined together, are raised, leaving the spine on the bed; a quick extension is then made, after which the hands and feet are loosened in a rough way.

Inguinal hernia is avoided by hot applications to the testicles. This is usually made every day during the first week after birth, and after the bath during the remaining few weeks.

When a child of tender age is attacked by convulsions, burning pieces of cocoanut shells, which have been previously cut in a triangular form, are applied around the mouth, and after this

operation a small amount of "boa" (snake) gall or iguana gall diluted in milk or water is given.

Not all of these customs are wholly bad; even some of the most crude are primitive expressions of a pathetic struggle after the light and a blind effort toward self-preservation and the perpetuation of the race.

THE ABORTIVE TYPE OF GENERAL SEPTICEMIA, FOLLOWING PELVIC INFECTION IN PREGNANCY; AUTOGENETIC INFECTION; PUERPERAL POLYNEURITIS.

BY

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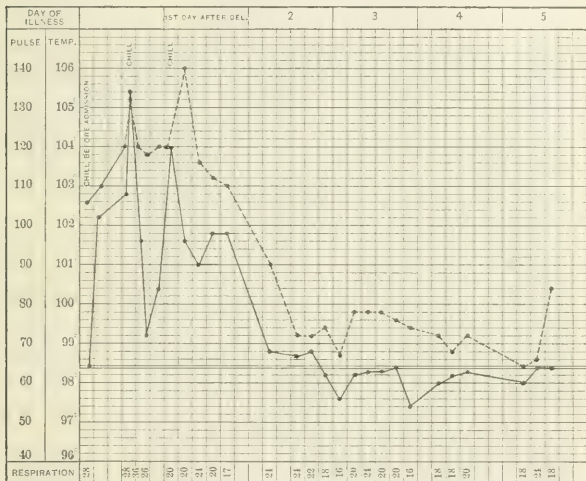
(With chart.)

FOTHERGILL appears to be perfectly correct in his criticism of the term "Puerperal Fever." Local and general septic processes in the puerperium are infective, not infectious. The same micro-organisms cause these lesions which are the etiological factors in wound infection in any other part of the body. "Puerperal pelvic infection" is a much better term, covering multifarious cases, which may vary in nature, source, route, site, and date of the infection, as also in nature, date, severity and localization of the resulting inflammatory process. There is no such disease as "Puerperal Fever."

The writer would like to apply the term "Squall" to this abortive type of general septicemia, because of the stormy onset, a period of activity and suspense, followed by the sudden and complete disappearance of the alarming symptoms. Considering that the mortality in the surgical fevers of childbed varies from 10 per cent. to 75 per cent. in various epidemics, it is with considerable concern that the attending obstetrician views the history of a chill followed by a fever, or any other suggesting phenomena of general bacteriemia in the puerpera.

Case Report.—B. W. (University of Minnesota Hospital No. 7770), a rachitic negress, age nineteen, because of a contracted pelvis, on September 9, 1912, was delivered by Cesarean section of a living full term child at this institution. It is interesting to note the development of a puerperal neuritis during her stay in the hospital at this time. Three weeks following the date of her operation, Cesarean section in 1912, she developed what appeared to be a mild attack of multiple

neuritis, characterized by tenderness of the muscles and nerve trunks of both arms, hyperesthesia of the posterior tibial muscles, slight nystagmus, myoidema and tremor of the fingers of both hands. These cases of puerperal neuritis are extremely rare, some cases being reported by two German physicians, Moebius and Mader. No case has ever been reported at the Sloane Maternity Hospital, New York. This patient was again admitted into the maternity wards, in labor on December 30, 1915; one-half hour afterward she was delivered of a female fetus, which was probably between five and



six months of age. The cardiac and respiratory functions of the newborn continued without artificial aid for more than eleven hours, when they ceased. The weight of the infant was 630 gm. and it measured 32 cm. As the average weight and height of a five lunar months fetus is from 250 gms. to 280 gms. and 17 cm. to 26 cm. respectively, and one of six lunar months weighs on the average 645 gm. and measures 28 cm. to 34 cm. (DeLee), the age of the infant under discussion was approximately slightly more than five and one-half lunar months. The period of gestation, based on the menstrual history confirmed this calculation, being about twenty-two weeks and five days in duration. The eyes could be opened, the subcutaneous fat was poorly developed, vernix caseosa was beginning to be formed, but notwithstanding its creditable attempt at self-preservation, the child's death ensued in twelve hours. The ultimate result, however,

would have been the same, death resulting from starvation and congelation due to the undeveloped state of its necessary vital systems. The rearing of such infants belongs to the domain of either a fertile imagination or a remarkable capacity to subsidize the truth.

Three weeks before admission on December 30, 1915, patient said that "some water had come away," and one week later "had a small show of blood" unaccompanied by any pain. About one week before coming to the hospital she passed several clots, and on the night before her admission to the institution she began to bleed quite profusely, which continued until the fetus was expelled.

The patient was poorly developed, ill-nourished and quite badly deformed from her scolorachitic condition. She suffered from dental caries and pyorrhea alveolaris so frequently found in her class. The thyroid was slightly enlarged and her tonsils had previously been removed. The only other point of interest in her history was the presence of tenderness over the anterior tibial muscles, which later proved to be neuritis of a mild type. Previous to her entrance to the hospital she had had an antepartum chill, followed by a rise in temperature. She was delivered at 11.00 A. M. At 1.00 P. M. two hours after her accouchment, the patient suffered from a severe chill and at 2.20 P. M. her temperature rose to 105° , her pulse being 132 at this time. She complained of no pain in any region and there were no abdominal symptoms. At 3.00 A. M. the following morning the patient suffered from another chill and at 4.00 A. M. her temperature registered 104° , pulse 140. Her temperature gradually declined during the next twenty-four hours and on the morning of the third day of her illness, it was practically normal, where it stayed during the remainder of her sojourn in the hospital.

At 3.30 P. M. on the second day of her puerperium, Dr. W. C. Johnson, the pathologist of the University Hospital, took a blood culture and found a pure growth of staphylococcus aureus. A throat culture proved to be negative. The blood count on the same day showed 11,200 leukocytes and the following differential count was reported, polymorphonuclear 69.5, lymphocytes 28, transitional 2, basophiles 0.5. On the seventh day of the puerperium another blood culture was taken, which proved to be negative, but a culture from the lochia showed many colonies of staphylococcus aureus.

A final pelvic examination made on the ninth day proved to be negative in all details.

At no time was the lochia unusually foul. The patient during the acute stage of her illness always felt very well and complained of no unusual symptoms. Nor was her desire to get up during her febrile period interpreted as an example of that dangerous symptom, due to the dulling of the higher centers, seen quite frequently in bad cases of puerperal sepsis.

As this was a case of antepartum infection what was its source, and the nature of the primary lesion?

She positively denied any attempt on the part of herself or any-

one to induce an abortion. The last vaginal examination had been made over a month previous to her confinement, by a member of the obstetrical staff of this hospital. If her statements are correct in this regard, the method of infection was probably autogenetic and not heterogenetic. Although there is a difference of opinion in regard to the normal puerperal uterus being sterile, most investigators who have been particularly careful in their technic, have found it uncontaminated. Fifteen per cent. of normal puerperal vaginal cases examined have been found to contain streptococci by some observers. Foulerton in England found that the colon bacillus and staphylococcus albus are frequently present in the vagina of the normal puerpera, but was unable to isolate any organism of greater virulence in the normal cases examined. Streptococci are frequently found on the vulva. The pneumococcus, gonococcus, streptococcus and staphylococcus aureus are found in the vaginal cervix and vagina under abnormal conditions.

As the virulence of pathogenetic bacteria declines in the absence of reculture upon a suitable medium, and increases by transference from one person to another, it probably can be said that many cases of autogenetic infection are quite mild compared to heterogenetic sepsis.

Note the history of this case. Three weeks before delivery a slight discharge of amniotic fluid took place, possibly due to a rent in the membranes high up; two weeks before her labor, a show of blood presented itself, and one week thereafter she passed several clots. She bled freely the night before she was confined.

The virulent germ staphylococcus aureus, only a visitor in the genital tract under abnormal conditions, was found in the vagina as stated above; the discharge of amniotic fluid denoted an open avenue for infection in the amniotic sac; the blood clots discharged on more than one occasion offered an open wound for infection. The result was logical. An ascending growth of staphylococcus aureus from the vagina to the fertile soil in the cervix or uterus.

Pyorrhea alveolaris and other distant foci are usually considered too remote a source for genital infection by many authors (Jaggard, Leopold, Dodërlein, Kronig, Forchier, Williams), and in the writer's opinion the individual had probably developed a fairly well-organized resistance to the bacteria producing that chronic affection. Wegelius, DeLee, and Walthard among others, although admitting the possibility of autoinfection, prefer to apply the term only to the genital tract as the primary source of infection. A migration of organisms from this large intestine might offer an explanation of

the source of infection. Where did this poorly nourished, rachitic patient develop her great resistance? Perhaps her lysins, opsonins and agglutinins in virile power, depended upon a tenement life, a squalor resistance, or an acquired strength against certain germs, following their autogenetic existence. The emptying of the uterus probably assisted her recovery.

Modernists are disregarding that theoretical division of puerperal sepsis into sapremia, septicemia and pyemia for the hypothesis upon which it was based has not been born out by fact. In all local infections of the genital tract bacteria in varying numbers migrate into the blood to be annihilated. Therefore, a diagnosis of malignant septicemia cannot be made from a blood culture alone, and furthermore pathologists are now teaching that such organisms as the streptococcus and colon bacillus may assume the mantle of the saprophyte and so produce merely a septic intoxication. It can be stated probably with reasonable certainty, that this was a mild attack of general septicemia caused by an active organism, the staphylococcus aureus, which, when gaining ingress to the blood channels was quickly destroyed through the agency of a well-developed resistance against such bacteria.

This case is probably not an unusual one as far as obtaining a blood culture of the offending organism is concerned. But in its abortive nature, considering the violence of the invasion, it is perhaps atypical. Very likely there are many cases diagnosed by the inappropriate term of sapremia, which if a blood culture was taken would show a true bacteriemia. A blood culture is frequently difficult to obtain, however.

Later in the puerperium smears from the pyorrhea present showed a great variety of organisms but very few cocci were seen. Smears from the vagina showed bacilli and cocci. Cultures from the mouth, vagina, cervix and uterus were negative for staphylococcus aureus. The staphylococcus albus was found in the vaginal and cervical cultures.

Recently Zangemeister and Kerstein (*Arch. Gynak.*, 1915, civ)** have come to the following conclusions in regard to autoinfection based on careful clinical studies and observations upon pregnant women. That bacteria capable of producing rise of temperature and other disturbances are present in and about the genital tract of pregnant women, who have never been internally examined, that these bacteria are found in the lower portion of the genital tract in 89 per cent. of cases examined and in 25 per cent. of cases examined they were found in the upper portion. Clinically in

the occurrence of fever in patients, in whom germs were found in the genital tract before labor, showed that these bacteria undoubtedly produce infection entirely apart of any bacteria introduced during examination or manipulation. Many of these bacteria are probably swept downward by the escaping amniotic fluid, placenta and membranes, and by the after-coming blood and serum. The blood serum following the removal of the placenta is an excellent application to the wounds received during labor. Serious infection does not occur in these cases, when the course is from above downward. Sterile coagula plugges the uterine sinuses and the uterus remains contracted. But frequent examinations manipulations and unsuccessful attempts at delivery carry these germs into bruised and wounded tissues to the cervix and produce infection.

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MANAGEMENT OF ECTOPIC PREGNANCY.

BY

A. MERRILL MILLER, M. D., F. A. C. S.,

Danville, Illinois.

ECTOPIC pregnancy is a typical border-line lesion and may change from a medical to a surgical condition in a very brief period. We have had too many dogmatic statements concerning its management in which the individual was not a consideration. At present the most urgent need is a more acute sense of diagnosis, keeping this condition in mind when confronted with lower abdominal lesions.

The mystery of extrauterine pregnancy has largely disappeared, due to a wider knowledge on the part of the family physician. He sees these patients first and, much to his credit, is making the diagnosis in an increasing proportion of cases. In consequence a vastly greater number of them are being recognized before they reach the tragic stage of rupture and exhaustion through hemorrhage. This type of case will always be found due to the patient's indifference to pelvic discomfort and the difficulties or impossibilities attending an early recognition.

Diagnosis does not rest on any one individual factor. Much work has been done and many theories advanced in an effort to

discover the causes operating to produce this lesion. As yet, many cases have been found which cannot be listed in the present classification. This want of completeness has stimulated many investigators to enter the field of research. It is certain that more than one exciting factor exists.

The commonly enumerated causes, mechanical obstructions, chronic inflammation (Huffman), anomalous embedding (Webster), decidual reaction (M. Schil), failure of unstriated muscle to contract, cover a large number of cases. Even with this list of operating causes there is still a considerable number which cannot be classified.

Because of highly organized structures involved, and the peculiar tendency of women to be affected by nervous influences, we might attribute a considerable number of cases to a nervous condition. I have presumed to offer a theory which, although not subject to histologic proof, answers well as a working hypothesis. It presupposes that some factor is involved which has an influence over the entire reproductive system, and at once directs attention to the nervous mechanism.

The tubes are lined with ciliated epithelium maintaining a wave-like motion toward the uterus. Normally this carries the ovum along its course in the direction of the uterus, and probably inhibits the outward movement of spermatozoa toward the free end of the tube. To maintain this wave-like motion implies the presence of continuous nervous stimulation. It is my belief that the arrest of the fecundated ovum along the course of the tube is due to want of motion of the cilia, some disturbance in the automatic mechanism, or absence of nervous impulse: a *depressor neurosis*.

Symptoms do not group themselves in any characteristic manner. Vagaries are constant. A period may or may not have been missed, often so but not constant. Bleeding may persist for weeks and be the only symptom except pain, of the real condition. I think the most constant symptom is a vague sense of discomfort, unilateral, corresponding in location to the tube involved. An almost uniform complaint, when symptoms are noted, is the rectal discomfort, aggravated by stool or the use of an enema. Sterility seems so constant as to impress one, yet I have seen this condition after five normal births. The discomfort of first pregnancies often postpones examination till a rupture has occurred.

Concerning the symptoms of an acute rupture, we have the well-defined, easily recognized symptoms of shock, pain, rapid pulse, subnormal temperature, vasomotor relaxation and air hunger. In dealing with acute shock from hemorrhage, we are confronted

not with extrauterine pregnancy as such, but with a condition of shock whether pulmonary, gastric or postoperative bleeding. If any truth has been established as a result of a vast clinical experience it is that death seldom occurs during *any* primary hemorrhage.

Pelvic examination may be as unsatisfactory as the history. Due in part to firm abdominal walls, a nervous patient, an ill-defined lesion, we are unable to do little more than discover an acutely tender tumor.

Since no constant factor has been discovered affecting the cause or frequency of ectopic gestation, nothing can be said concerning prophylaxis.

The management of ectopic pregnancy is second only to its recognition, and calls for the keenest surgical judgment. This will be reflected in the mortality reports. The treatment of an individual patient cannot be decided by a preconceived notion of what that treatment should be. Medical men seem to be of one opinion, that the final and curative measure is surgery. When and where this should be done is a test of diagnostic acumen and nice judgment. Pain is best controlled by sufficient morphine to produce comfort. Severe shock and a prolonged convalescence are best managed by direct transfusion of blood.

508 THE TEMPLE.

DERMOID CYST OF THE OVARY, WITH TWISTED PEDICLE, AND ACUTE APPENDICITIS, COMPLICATING PREGNANCY.

BY

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A REVIEW of the literature of the past fifteen years, reveals only one reported case with the above interesting pathology (Gerster). Cysts of the ovary with pregnancy are of rare occurrence. Samgin in an analysis of the reports of two of the large foreign clinics found only five ovarian cysts in 17,832 labors at the Berlin Gynecological Clinic. In the St. Petersburg Lying-In Hospital, two dermoids were observed in 10,893 pregnancies. Olshausen collected 2275 ovariectomies of which 80 (3.5 per cent.) were dermoids. According to Pfannanstile they occur in only 7.5 per cent. of all tumors affecting these organs. Deletréz discovered a gravid uterus only twelve times in 1132 ovarian tumors. Williams finds cysts of this type three times more frequent in the pregnant than in the nulliparous

woman. In a series of 331 dermoid cysts collected by Manton in the past ten years, ninety-two were associated with pregnancy. Most authorities agree that the presence of an ovarian tumor during gestation, is one of the most serious complications, as it markedly increases the probability of abortion and frequently offers an insuperable obstacle to delivery at the time of labor. Moreover, its presence gives rise to disturbances during the puerperium, which menace the life of the mother. All varieties of ovarian tumor may complicate pregnancy and labor, but dermoid cysts seem to occur with the greatest frequency. McKerron reported 107 cases in which the nature of the tumor was stated and found 43 per cent. dermoids. Again, Spencer reported forty-one cases with 30 per cent. dermoids. These tumors should be removed as soon as the diagnosis is made, neglect of this being fraught with grave consequences to both mother and child. Remy found 17 per cent. abortions or premature labors in 321 pregnancies with ovarian tumors. In 721 cases in which pregnancy was allowed to run its course, McKerron found a maternal mortality of 21 per cent. while more than half of the children were lost. In the early months of gestation the dangers are most frequently from torsion of the pedicle and infection. The presence of the tumor seems to have no influence on menstruation or conception. A great many women go to term without knowledge of its existence, the growth of the neoplasm not being accelerated as in the case of fibroids, and abortion only taking place in the presence of complications. Torsion, gangrene from pressure, rupture, and suppuration take place in the later months. Herman reported a case of a cyst blocking the pelvis during labor, child dead.

CASE I.—H. A., married, primipara. Family history, negative. In her ninth year was treated for pains in the lower abdomen which lasted two months and then disappeared. During her thirteenth year these pains again made their appearance in the abdomen; this time they were sharp and lancinating in character, radiating down the right thigh. During the next three years the pains occurred at irregular intervals. Menstruation commenced at sixteen and took place regularly every eighteen days, was of three days' duration, accompanied by severe premenstrual and comenstrual pain. Last menses occurred March 17, 1915. On August 1st she was seized with sudden sharp pain in the right lower abdomen with vomiting and prostration. This attack lasted three days. One week later pain appeared again in right side, this time more severe. First seen three days after the beginning of the second attack. Temperature 102, pulse, 120, respiration 34. Patient thin, rather anemic, seemed to be in great pain. Heart and lungs negative. Abdomen enlarged. Uterus about size of five months' pregnancy.

To the right at McBurney's point and lower is a large mass exquisitely tender and painful. Vaginal examination was unsatisfactory, as the slightest pressure with examining finger caused intense pain.

Operation August 11. Straight incision through the rectus. Ovarian tumor found with two twists in its pedicle. Clamped and removed. Just behind it was an acutely inflamed appendix, adherent to posterior wall, which was removed. The patient's convalescence was uneventful. She left the hospital fifteen days after the operation. For the first five days following the operation she was kept under the influence of morphine.

The first of the following January patient gave birth to a healthy normal child.

The specimen was a dermoid cyst of the ovary, 4 inches in diameter, filled with sebaceous material. It contained six teeth, and some hair. Numerous hemorrhagic areas were scattered over its surface.

145 SIXTH AVENUE.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held May 23, 1916.

DR. GEORGE W. KOSMAK, *in the Chair.*

DR. D. W. TOVEY reported a case of

RESTORATION OF ANAL CONTROL.

This patient, Mrs. K., twenty-eight years of age, had two children, four and six years of age. Menstruation had always been regular, though slightly painful. She was born without an anus, the feces coming through the vagina and there being no control over the movements which occurred immediately after eating. When twelve years of age she was operated upon and the rectum placed in the perineum. Ever since this operation, eighteen years ago, she had had no control of her bowels, which move immediately after eating, and continue to discharge for a couple of hours, the movements being accompanied by large quantities of gas. The patient ate breakfast and spent most of the morning in the toilet. She ate no lunch for if she did she could not go out in the afternoon. She ate dinner in the evening and spent most of her time during the evening in the toilet. When first seen the patient was emaciated, the abdomen distended with gas, the right kidney was in the iliac fossa when she was lying down, and there was a general gastroenterop-

tosis. The uterus was retroverted and movable. The vagina and rectal opening were drawn up under the pubes. The rectal opening was on the same level as the vulva, the mucosa was prolapsed and pouting, and the anal opening was widely patent.

The patient was operated on on March 11, 1916. The perineum was intact. The vaginal opening was closed by the action of its muscles, the levator ani drawing it with the anal opening up under the pubes. An incision was made along the mucocutaneous junction of the vulva as was done in operations for suture of the levator ani. The posterior vaginal wall was separated from the rectum for $2\frac{1}{2}$ inches. An incision was made in the perineum from the mucocutaneous junction downward for an inch, to fully expose the field. The rectum was separated from its attachments down to the anal opening, as is done in vaginal extirpation of the rectum. The internal sphincter was narrowed by sutures, the upper suture being attached to the vagina. This was found to draw up the pouting anal mucosa on the anterior wall of the anal opening. An incision was then made three-fourths of an inch posterior to the anal opening and the wound deepened. The puborectalis was found by tracing it backward from the anterior wound. It was sewed together behind the rectum and the internal sphincter attached to it. The cut ends of the sphincter ani were found in the anterior part of the posterior wound and the coccygeal attachment, running back to the tip of the coccyx, in the posterior part of the wound. These sphincter ends were fastened to the coccygeal attachment of the sphincter. Sutures were also used to sew the puborectalis to the sphincter. The posterior incision was then closed except for small rubber tissue drains, which were carried around the rectum to the anterior wounds. The anterior incision was closed by suture of the levator ani in front of the rectum. The wound was closed with layers of buried sutures of No. 2 chromic gut. The transversalis perinei were found attached to the sides of the vagina instead of to the center of the perineal body. Dr. Tovey believed that the surgeon, when he closed the vaginal anus and placed the rectum in the perineum, cut the sphincter ani and puborectalis in the perineum, and that they failed to unite.

The patient had severe postoperative pain, relieved partly by morphia and partly by $\frac{1}{2}$ grain of quinine urea. The drains were taken out on the fourth day. There was an infection of the posterior wound due to hot compresses employed to relieve pain.

The patient now has to take cathartics to move the bowels, and complains of pain in her abdomen due to gas retention, caused by her enteroptosis. The writer believes that this can be relieved by abdominal support and diet. There is some pouting of the anal mucosa, but the anal opening which was on a level with the vulva is now drawn up and the gluteal cleft has returned. The pouting mucosa annoys the patient somewhat as it is constricted by the sphincter. If it is pushed back it stays for a while and the patient has been instructed to push it back after movement of the bowels.

Dr. Tovey presented the patient and called attention to the position of the right kidney.

DR. JOHN VAN DOREN YOUNG reported a case and commented on
THE UMBILICAL CORD AS A FACTOR IN INFANT MORTALITY.

"This subject may be considered under two heads: The umbilical cord as a factor in infant mortality (1) during gestation and (2) at birth. Under the first subdivision knotting of the cord is the most common cause of circulatory obstruction and consequent death of the fetus *in utero*. One such case came under the writer's observation in which a tight knot caused fetal death at the eighth month. There could be no possible determination of this accident prior to fetal death and it must therefore be considered as one of the accidents incident to pregnancy.

"In the second class of cases I wish to draw special attention to the encircling of the child's neck by the cord with the hope that some light may be thrown on its causation, diagnosis, and treatment. That the cord is frequently about the neck of the child is a matter of common observation and is of importance only in relation to its length and elasticity, number of coils, and placental implantation. Hydramnion is given as a cause of the cord encircling the neck of the child, but it would seem to me an occurrence far too frequent for this to be other than an incidental factor. Over-activity of the child is coincident to and may be a cause.

"At birth an imperfectly flexed head with over-recedence between pains, shock during pains, or symptoms of accidental placental hemorrhage renders the diagnosis probable of an impeding of the child's progress by the cord. The largest number of coils reported as having been found about the neck of a child is eight. The treatment is Cesarean section if the life of the child is to be considered.

"The case to which I wish to call attention is that of a primipara, with normal pelvic measurements. She had had a laparotomy for septic peritonitis eight years ago. The membranes ruptured spontaneously at 3 A. M., December 19, 1915, while the patient was asleep. Pains continued until 3 P. M. when I inserted a No. 4 bag. Full dilatation was obtained at midnight. One-half ampule of pituitrin was given at 12.15 and at 12.48, December 20th. The head engaged but over-recedence was noticed between pains and shock during pains. The position was R. O. A. Tucker McLane forceps were applied but all efforts failed. I then applied axis traction forceps to the child, an assistant making traction on the bar while I manipulated the handles. The patient showed marked shock during traction. On delivery of the head the cord was found three times about the neck, and pulled to an exsanguinated rope, a noose being formed by the cord. The child was dead on delivery. The placenta was posterior fundal in its implantation. The cord measured 106.5 cm. The circumference of the child's neck was 21 cm., this taking up 63 cm. of the cord. From the umbilicus to the neck was 17 cm., making a total of 97 cm. This left 9.5 cm. play of the cord from the umbilicus to the placental origin. (See illustration.)

"The deduction to be drawn from this case is that Cesarean section was indicated by the over-recedence of the head, the failure of the

first forceps attempt, and the shock during pains or forceps traction; it was contraindicated by the adhesions known to exist after the septic peritonitis and operation."

DISCUSSION.

DR. A. J. RONGY said: "My brief discussion is based on the complications of the cord met with in the last 10,000 cases from the obstetrical services of the Lebanon and the Jewish Maternity Hospitals."

"One should always suspect pressure on the cord when the head reaches the perineum and no progress is noticed although the pains are strong and at regular intervals, and if in addition a sudden alteration in the fetal heart rate is discovered, labor should be terminated quickly because of danger of death of the fetus. I am sure every obstetrician has met with this clinical phenomenon. In one case there were six twists of the cord around the neck. The neck in this child was so stretched and thinned out that it appeared strangulated. In two cases five coils of the cord were found around the neck; both children were stillborn. In two cases there were true knots of the cord causing the death of the babies."

"Since the introduction of aseptic and antiseptic methods, infection of the cord very rarely takes place, particularly is this true since we have adopted the method of dressing the cord with pure alcohol. Alcohol tends to keep the immediate area around the cord dry, and account of its bactericidal action the danger of infection is lessened. In one case secondary hemorrhage from the cord proved fatal. There were two cases of erysipelas of the cord and one case of abscess of the cord; the three babies succumbed to the infection. In three cases there was a complete hernia into the cord; in one case the colon was found to terminate in the hernia; in two the hernial contents consisted of coils of the small intestines. Two cases were operated on but finally died. This condition is always fatal."

"Pituitrin must be considered as a great factor in cord complication. It has been my experience in not a small number of cases that the administration of pituitrin may cause a contraction of the umbilical vessels so that the pulsation of the cord scarcely becomes perceptible. Many babies are born asphyxiated as a result of the use of pituitrin particularly so when given in large doses. The fetal heart sounds must be carefully examined before pituitrin is given. If at any time the fetal heart sounds are not found to be distinct and regular, pituitrin should not be administered."

"In the light of our present knowledge, it is impossible to make a diagnosis of the cord around the neck during the antepartum period; and at best a diagnosis of this nature is purely instinctive, based on past experiences."

DR. HAROLD C. BAILEY said: "A short cord is quite rare. There is a report of a cord as short as 7 cm. The records during the last year at the Manhattan Maternity Hospital show that there were five short cords. The shortest of these was 37 cm. in length. A cord is considered short when less than 50 cm. A cord 37 cm. long

is long enough to reach from the placenta to outside the vulva. Of these five short cords only three gave any trouble. In three instances the condition was diagnosed before delivery. One was an outdoor patient, who was a long time in labor. The head was on the perineum and the house surgeon went to apply the forceps but before he could do this the baby was delivered with the cord torn off $\frac{1}{2}$ cm. from the umbilical ring. The child bled profusely. A circular purse-string suture was inserted and the cord closed over in that manner. This cord was 37 cm. in length and there must have been a twist about the body or shoulders of the baby to produce such a condition. In one case, delivered by one of the visiting staff, the head was on the vulva and receded to an abnormal extent in the intervals between pains and this led to a diagnosis of the condition. In another case there were two coils of the cord around the neck and the cord was cut and the baby delivered; it was found that the cord in this instance measured 45 cm. This was a case in which the cord was short and at the same time wound around the baby's neck. During the delivery the placenta was detached and there was a very sharp hemorrhage. The patient became very anemic and a kidney and bladder infection followed. If we could diagnose this condition, much better treatment could be given the mothers as well as the infants. If we could make the diagnosis it might be better for the mother as well as for the baby to do a Cesarean section, but it is very seldom that a diagnosis can be made."

DR. ASA B. DAVIS said: "This matter has been very well discussed with reference to the antepartum signs of short cord or cord about the neck or body of the child, and also during the period of labor. The point with reference to the abnormal recession of the head in the intervals between pains has been brought out. I will say that when we see a case in which after a uterine contraction there is a recession of the head unduly great we will find in that type of case that we are dealing with a short cord or a long cord rendered short by being wrapped around the neck of the baby. Of course if one could make a diagnosis, a Cesarean section would be justifiable, but one must think twice before deciding on a Cesarean section after the forceps have been applied high up in the uterus, because of the danger of sepsis. I have lost a case in which infection probably took place through the cervix, but I have also done Cesarean section in such cases successfully. It may be aside from the subject but the management of the cord after labor, say during the first ten days, gives me much concern, for I believe that many of the disturbances that we see in infants come from infection that occurs during the separation of the cord from the umbilicus, such as green stools, rise in temperature, and loss in weight. During our first year in our maternity hospital, when the details of our work were undeveloped it was a common practice to use a dusting powder to dry up the cord, and we used starch since we needed a large quantity and it was economical. After a time some boric acid came in and it occurred to me that it would make a good dressing for the cord. Some time after this we

got a new man on the house staff and he made up a complete record of the histories and in doing this he recognized that at a definite time there occurred a distinct difference in the time at which the cords separated and it was found that this time coincided with the time at which the starch was changed for the boric acid. The difference was so striking that it could not possibly have been a coincidence. I have found that every once in a while we get a case where a separation takes place between the cord and the navel and infection gains entrance and we have a thrombosis; there may be a thrombosis of the vessel right up to the liver. We sometimes get abscesses at sites far distant from the entrance of the infection, such as in the middle ear, and we will find that the infection probably gained an entrance at the umbilical stump."

DR. ARTHUR STEIN.—"I cannot imagine why any compression of the cord should take place in a patient in whom the normal action of the uterus is stimulated by the use of pituitrin unless one was dealing with a prolapsed cord. At the Harlem Hospital, where we have about 1000 obstetrical cases a year, we have never observed any such effect upon the cord or upon the child. I should like to have Dr. Rongy tell us how he explains this assumed action of the pituitrin."

DR. RONGY.—"In reply to Dr. Stein, I would say that there is no question in my mind that pituitrin caused and will cause many babies to be stillborn, particularly so when it is used indiscriminately. I am sure all of us witnessed the tonic and clonic contraction of the uterus produced by this drug. In such cases the placenta may be so compressed that the fetal circulation will be interrupted and asphyxia will result. Those who have had large experience with the administration of this drug have noticed the sudden alteration in the fetal heart sounds immediately following its hypodermic injection. I have seen many such instances."

DR. YOUNG.—"This case worried me for I felt that if we had taken into consideration the recession of the head and the shock to the mother, which was out of all proportion to that of a normal labor we might have come nearer to the diagnosis, and we might have saved both the child and the mother."

Dr. Rongy's point adds something to our knowledge of these cases.

"I have been interested in the tensile strength of the cord. In this instance I did not have the apparatus for testing the tensile strength of this cord, but it lifted a 25-pound pail of water."

"I am sorry that someone has not given more definite symptoms by which one could determine this condition which would save inflicting trauma on the mother, for as Dr. Davis has said, one must be very careful in doing a Cesarean section after trauma has been inflicted by a high forceps application."

DR. GEO. W. KOSMAK presented a report of a case of

TOXEMIA IN PREGNANCY FOLLOWING THYROIDECTOMY.

The patient, Mrs. L., aged thirty-two, married in April, 1914, gave a history of a thyroid enlargement for which a thyroidectomy was

done on June 5, 1915, at the French Hospital by Dr. Pool. The patient had a profuse period beginning July 1st, which lasted six days and she bled again for five days beginning July 11th. About August 1st there was a moderate flow with cramps. On September 1st there was slight staining which lasted for a few days. On October 27th she began to pass small black clots, which persisted for about two weeks and there was some pain on straining on the right side. At the end of November she again stained for several days and this continued on and off since then. She was referred to me for attention during her confinement on December 6, 1915. At that time she gave a history of marked nausea and vomiting since September, constipated bowels, attacks of nervousness, flushes, and tachycardia. Examination at this time showed a woman of rather underdeveloped neurotic type and there was a moderate exophthalmos present. The pulse was small in quality and about 110 to 115. A transverse scar on the anterior surface of the neck was present. The breasts were hard and there was a slight trace of secretion in the right one. The abdominal wall was moderately thick and a rounded tumor could be made out in the lower part like a five months' pregnancy. There was slight tenderness present in the left iliac region. During the succeeding few weeks a great deal of difficulty was experienced in correcting the nausea and vomiting and various complaints of neuralgic pain, etc. Indigestion after eating, with various neurotic sensations continued, and the patient believed that she felt life about the middle of December. During the succeeding months the patient continued to have a variety of nervous disturbances with attacks of dizziness, rapid pulse, insomnia, neuralgic pains in face and head, and occasional attacks of nausea and vomiting. During the month of January the patient's condition was apparently improved, the feeling of apprehension and nervousness being very much diminished. During February attacks of nausea and vomiting returned and dizziness with visual disturbances was complained of. A slight swelling of the hands and feet was present during all this time. The urine was practically normal, the tests for albumin, sugar and indican being negative, although the specific gravity had a tendency to be rather high. In the belief that some of the symptoms might be due to a low thyroid secretion the extract was given in small doses continuously, but no effect could be noted. During the month of February a moderate degree of hydramnios developed and in the succeeding month her condition continued about the same except that she became more uncomfortable. The patient claimed that she felt better while taking the thyroid extract and noticed a difference in her general condition when she stopped the same for a few days. I am not prepared to say whether this observation was of any value. Her labor was figured as being due about the middle of May and evidences of a disturbance of the kidneys began to manifest themselves after May 5th, characterized by swelling of the hands, feet and face, reduction in the amount of urine with the appearance of marked traces of albumin, and granular and hyaline casts.

Attempts to induce labor with the Voorhees bags were only moderately successful and a dilatation of three fingers was only secured after forty-eight hours. The head failed to engage and as a considerable amount of liquor amnii was present the membranes were ruptured but as the pains were weak the head remained at the brim and apparently in an occiputposterior position. Owing to the small size of the vagina it was impossible to determine this accurately or to have attempted rotation. During this time the patient continued to vomit and complained of severe occipital headache. In view of the apparent inability of the patient to deliver herself a Cesarean section was decided on, as a vaginal delivery without extreme laceration and a possible craniotomy seemed impossible. The operation was done under gas and oxygen anesthesia on May 15th, the extraperitoneal procedure being done in view of the prolonged labor, the frequent examinations, and the presence of a temperature of 102° F. A half ampoule of pituitrin was ordered to be given as the uterus was being incised, but owing to a misunderstanding the attendant gave it without the knowledge of the operator before the abdomen was opened. As the uterus was incised it was found to be in a state of tonic contraction and combined with the anesthetic and the placenta under the uterine wound made the extraction of the fetus difficult, so that a stillbirth resulted. The patient stood the operation fairly well and although a moderate degree of ileus developed on the third and fourth days, she made a fairly good recovery. The lower angle of the abdominal wound had been provided with a drain and considerable sloughing of the fascial layer took place. As soon as the slough separated the abdominal wound healed promptly. During the convalescence the headaches disappeared, the urine increased in amount and the general condition improved. Within a period of three weeks, however, an exacerbation of the nephritis occurred.

The case is of interest because of the doubt which existed throughout the pregnancy as to whether the symptoms of the toxemia were due to the disturbed thyroid function or whether they existed independently of the same. The influence of the thyroid in pregnancy is not yet fully understood and the case teaches a lesson as to the necessity for great care to be exercised in those women in whom the thyroid or part of the same has been removed before they become pregnant. In this case although the pelvis was of normal dimensions, the woman's general physical condition precluded the possibility of an easy labor and undoubtedly a better result would have been obtained if this fact had been recognized and a Cesarean done before the prolonged labor affected the viability of the child and reduced the mother's strength.

DISCUSSION.

DR. HENRY C. FALK (speaking for Dr. Pool).—"The operative procedure employed on the case which Dr. Kosmak reported was the one usually used in cases with bilateral enlargement. The right lobe was removed almost entirely except for its posterior portion

and the anterior half of the left lobe was also removed. The thyroid was drained by means of a stab wound below the scar."

"Microscopical examination showed that this was not a case of exophthalmic goiter, but an adenoma of the thyroid. There was no increase in the number of cells in the acini, e.g., there was no piling up of cells in the acini which is so typical of exophthalmic goiter. Dr. Pool who had done the thyroidectomy, believed that sufficient gland substance was left to carry on all the normal functions of the individual."

DR. HAROLD C. BAILEY.—"I have just seen a case in which thyroidectomy was performed so this subject seems very close at hand. It is a question whether the case of Dr. Kosmak's was not suffering from hyperthyroidism rather than hypothyroidism after the removal of the gland. It may be well to recall that hyperthyroidism goes on for as long as eighteen months after the removal of the gland. Dr. Martin Tinker says that hyperthyroidism continues for a year after removal of the gland."

"I wish to congratulate Dr. Kosmak on his excellent judgment in doing an *extraperitoneal* operation."

DR. MEYER RABINOVITZ.—"To my mind the symptoms of toxemia in Dr. Kosmak's patient were in some measure due to hypothyroidism. This patient has had a partial thyroidectomy performed for a simple adenoma. The surgeon's report states that in his opinion sufficient thyroid tissue has been left behind. The amount of thyroid substance that remained, might have sufficed for normal metabolic processes. During pregnancy, however, the thyroid has to compensate for ovarian hypofunction as the interglandular correlation between these two glands, is synergistic in type. In this case it is most likely, that the thyroid, whatever was left of it, could not stand the added strain of pregnancy, it lagged behind in its functions, and has thus served as a contributing factor in the development of this patient's toxemia. Thyroid feeding in this patient has resulted in satisfactory subjective improvement, which strengthens our hypothesis of hypothyroidism. Dr. Kosmak could not notice this improvement objectively, and therefore discontinued its administration, which I believe was not the proper course to follow. While I do not by any means ascribe the etiology of toxemia of pregnancy solely to hypothyroidism, yet I claim that we have a right to assume that thyroid insufficiency is one of the many factors causing the symptom-complex of pregnancy toxemia."

DR. RONGY said he would like to report an unusual condition that happened some time ago. A woman in the ninth month of pregnancy was seized with convulsions. She was brought to the hospital after having four attacks. The convulsions continued notwithstanding very energetic treatments. Delivery was accomplished by manual dilatation of the cervix and extraction of the child and her condition gradually improved. During the second week she was given 3 grains of thyroid three times daily to promote the secretion of milk. After taking thyroid for thirty-six hours she developed tonic and clonic convulsions which for the time being were uncon-

trollable. The thyroid was discontinued and her condition gradually improved. The question arose whether in this case the eclamptic seizures were not caused by hyperthyroidism.

DR. SAMUEL W. BANDLER.—“My purpose in speaking is to express an opinion based on a study of the literature and history of these cases. I feel that there is much doubt if we have any right to place any great importance on the relationship of the thyroid function to the etiology of eclampsia. It might be taken from what has been said here this evening that we believe that the thyroid function has an etiological relationship to eclampsia. Inasmuch as the removal of the thyroid fails to prevent eclampsia it seems to me we cannot regard hyperthyroidism as a cause of eclampsia.”

“A few words with reference to the pathology of eclampsia, one thing only is seen at autopsy and that is that the microscope shows lesions in the liver, spleen and other organs of the body that have been there for many days. These microscopic necrotic areas prove that a poison circulating in the blood has injured important organs and cerebral structures.”

DR. KOSMAK (closing the discussion).—“Dr. Bandler has rather misunderstood my statements. I did not state that hyperthyroidism is a cause of eclampsia, but brought out the fact that this case showed symptoms of impending eclampsia and it occurred to me that they might be explained by the report of the surgeon who performed the thyroidectomy as well as by the pathologist's report. However, very little is known as to the action of the internal glands in pregnancy or what that action may be. We are very much in the dark on this subject, but it would be better if we could treat the thyroid condition by some other method than by thyroidectomy. The surgeon tells us that in this case there was an adenoma which is very different from our conception of hyperthyroidism. We are now also told that our conception of the thyroid function is all wrong and that we should not speak of hypo- and hyperthyroidism. This case has been interesting to me because it is the only instance of a pregnancy in a subject from whom the thyroid has been removed, that has come under my observation.

DR. ARTHUR STEIN read a paper on

PRIMARY CARCINOMA OF THE VULVA.*

* For original article see page 577.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of May 12, 1916.

The President, DR. MILLER, in the Chair.

DR. JOSEPH S. WALL presented a report on

APICAL PNEUMONIAS IN CHILDREN.

These cases illustrate some of the difficulties in diagnosis.

CASE I.—A boy of eight years. Had been ill to a greater or less extent throughout his life. Two years ago had scarlet fever followed by otitis and a mastoid abscess. About a year and a half ago had a pneumonia of the right base. The past winter has been in fair health.

On March 27, 1916, was taken ill with fever and malaise and complained of his throat. His fever continued high during the night and there was restlessness and cough. I saw him on March 28th, with his physician, and at that time he had been sick exactly twenty-four hours. His temperature was 105° , he was delirious, at times attempting to get out of bed; there was some head retraction and constant incoherent muttering. He could not be aroused to answer questions and presented the syndrome of meningismus.

His breathing counted 25 to the minute. Examination of his chest was entirely negative excepting for slightly diminished resonance and suppressed breathing over the right upper lobe. A diagnosis of pneumonia of the right apex was made and confirmed by an examination forty-eight hours later when all of the signs of consolidation were evident. The boy recovered completely after an illness of one week.

CASE II.—Raymond, a boy of eleven years. Normal birth. Breast-fed for one and one-half years. Pertussis three years ago; measles, one year ago. Has always been backward in his studies; spent four years in the first grade of school and has recently been going to the "atypical school."

This illness came on suddenly April 1, 1916, with pain in the abdomen, chill, vomiting. He vomited several times during the night and complained of abdominal pain.

He was admitted to the Children's Hospital on April 2d, and when seen on morning rounds of the same day he was actively delirious, almost maniacal, and required restraint to keep him in bed. His

temperature was 102.5, respirations 22 and pulse 80. A physical examination of the chest revealed dulness, with suppressed breathing over the right apex anteriorly and posteriorly. There were no signs of consolidation. The leukocyte count was 7900. In the absence of other lesions and in the presence of dulness and diminished resonance over the right upper lobe, the diagnosis of lobar pneumonia was made and within another forty-eight hours was amply confirmed by the appearance over the region suspected, of the classical signs of consolidation. He reached a crisis on the seventh day and is now well. At no time in his illness was there the slightest respiratory embarrassment during the times of my visits. Only twice was there recorded in the late afternoon a respiration of 40. His pulse-respiration rate is most interesting. On first examination, pulse 88, respiration 20. At a number of later periods in his disease the following were noted: Pulse 120, respiration 28. Pulse 120, respiration 26. Pulse 120, respiration 36. Pulse 104, respiration 24.

CASE III.—Mary R., aged ten years. Previous history unknown. Was taken ill May 2, 1916, complaining of being sleepy and tired, and having pain in the right side. The next day the child's temperature was 105. On the second day of her disease her delirium and stupor increased. She was seen on this day by four or five physicians and the following diagnoses were made: Otitis media with mastoid and possibly sinus involvement; acute Bright's disease; meningitis; acute appendicitis. This last diagnosis resulted in the admission of the child to the hospital when she had been ill for forty-eight hours, with hurried requests for a surgeon and for the instant preparation of the operating room. These requests were complied with but an examination of the child by the Resident Physician and by the surgeon who had come to the hospital to operate, a right apex pneumonia was discovered by signs appearing solely posteriorly. The Resident declined to administer an anesthetic while the surgeon, with equal propriety, refused to enter the abdomen.

When I examined the child the next day there was pronounced stupor, varying with delirious outbreaks which required restraint by a sheet. The child could not be aroused to answer questions; there was no hurried breathing, but on the contrary the respirations during her whole illness varied between 28 and 36. The front of her chest was devoid of physical signs excepting suppressed breathing over the right apex. Posteriorly there were classical signs of croupous pneumonia over the same area. Her leukocytes were 11,000. She reached the normal line by crisis in eight days.

Briefly, the recital of these cases brings out the following points of some importance.

Pneumonia of the right apex is frequently so obscure as to escape recognition. The presence of falsely referred pain in right apex disease may result in operation for appendicitis. The right apex in children is the part affected in nearly half of the cases of lobar pneumonia.

These apex cases rarely show dyspnea or embarrassed breathing which puts one off guard concerning the nature of the illness.

Apical pneumonias, in my experience, are prone to be accompanied by the most marked cerebral symptoms, they are even called by some the "cerebral types" of pneumonia in children.

It is in this group of cases that the x-ray is of extreme usefulness in clearing up a diagnosis.

Finally, it is evident that bronchial breathing and bronchial voice are not essential for the diagnosis of pneumonia—especially when such is a "peripheral" lesion, formerly the so-called "central pneumonia."

DISCUSSION.

DR. ACKER had seen several cases of apical pneumonia; in children, some with a low leukocyte count, some with no evident lung symptoms at an early stage. The need of careful study before diagnosis was evident.

DR. FOOTE called attention to the occurrence of a definite lobar pneumonia in children. The symptoms were those of sepsis in a much more marked degree than the areas of consolidation warranted, especially in what were called central cases. The lack of respiratory symptoms was notable. Consolidation in the upper part of the lung gave referred symptoms. With streptococcic infection no immunity followed.

DR. ABBÉ knew of a case where the symptoms of an infection and the abdominal pain were so marked that the child was operated upon for appendicitis only to find a normal abdominal cavity. The following day the pneumonic symptoms became evident. Some years ago such pneumonia would have been attributed to the anesthetic, now the responsibility was being put on hasty surgery.

DR. WALL called attention to the necessity for stripping the child to allow a satisfactory examination. Examination of the posterior wall of the chest was most important. Marked delirium and stupor were frequent and very significant. Autopsy failed to show central pneumonias in any of these cases, but many were cases of peripheral consolidation. They started as cones with the apex toward a bronchial tube. Suppressed breathing and diminished murmur were signs only when a larger area of the bronchus was covered.

DR I. S. STONE read a paper entitled

CONSERVATION OF THE TUBE.

The progress made by gynecology is shown in the greater number of operations upon the uterine appendages in which the ovary is allowed to remain, whereas formerly it was sacrificed along with the tube upon the slightest pretext. The author claimed that many tubes may also be saved which are infected or contain visible pus, and which are now frequently removed upon suspicion or because the operator fails to ascertain, or else cannot determine, the presence or absence of dangerous microorganisms. It was stated by the essayist that nearly all text-books and most operators advocate radical operations upon the uterine appendages when there is known

or suspected specific infection in the uterus or tubes and the uterus itself is extirpated under such circumstances by many.

The author advocated the use of measures which may prove efficient in that many patients recover without loss of their adnexa and at least are symptomatically cured. The method proposed by him involved the sterilization of the uterine and tubal mucosa by some form of chemical bactericide. Solutions of mercuric bichloride had been used but for a few years past diluted tincture of iodine had been relied upon as the better agent. For some years the cases subjected to this treatment mainly included the more chronic cases. But from time to time cases of recent infection had been included until now the author feels assured that even these patients make good recoveries when properly managed.

Technic.—The essayist's technic includes the sterilization of the vaginal uterine and tubal mucosa as far as may be accomplished by the application of the tincture of iodine. First the vagina is cleansed and treated to an application of the diluted tincture, one part to three. The cervix uteri is then carefully dilated and curetted, after which the cavity of the uterus is thoroughly dilated by the iodine solution which is thrown into it with a glass syringe. The abdomen is then opened and if the appendages are to be saved, the tubes are irrigated by injecting them with a solution of the same strength as that used in the uterus if the pathologist reports the presence of intracellular micrococci or if there is reason to believe the acute conditions found necessitate the use of a solution of this strength. Otherwise one-half of this strength is used.

The results were stated as quite as satisfactory as those treated by radical operation. No one of these patients had required a second operation, while under the observation of the author. This was stated as in striking contrast to the experience of many who claim that they have to perform a second operation in a large proportion of their cases in which they leave an apparently healthy tube after the removal of the one on the opposite side for specific disease.

The essayist stated that impregnation had occurred in some instances after these conservative measures but that he was not prepared to report the ultimate conditions of these patients. For the present, however, he was mainly concerned in the effort to check the further progress of specific disease and to limit as far as possible the number of operations which mutilate and unsex women.

DISCUSSION.

DR. KANE had seen a number of Dr. Stone's cases for two or three weeks after operation. The temperature on the first day was usually elevated to about 101, and gradually dropped to normal by the third day. There was considerable pain at first in the acute cases, with masses on both sides. In some cases there was nothing abnormal to be felt when the patient left the hospital.

DR. SULLIVAN spoke of Dr. Stone as a pioneer in conservative work. He had seen the same thing applied ten years ago in chronic cases. He thought the results better than after the removal of the tubes.

DR. LOWE thought there should certainly be an effort to preserve the tubes in the hope of eventual recovery. He called attention to the adhesions that were present after operative procedures. Dr. Miller had never done any iodine work in the abdominal cavity because feared adhesions. The tubes would probably be closed after gonorrheal infection and he doubted if they would become patent after iodine injection. He had heard of several cases where iodine was said to have caused death and he would hesitate to repeat such conditions.

DR. LOWE had never seen a case die from the injection of the iodine, though one such case had almost died. It was a large fibroid uterus and was removed very rapidly before the shock was over. The patient's respirations had ceased and her pulse became imperceptible at the wrist, but she finally recovered.

DR. ABBÉ had seen several cases in which he, as anesthetist, had been satisfied that the cause of death was due to the injection of the uterus with diluted tincture of iodine. The attempt was being made to inject the Fallopian tubes from the uterus and force enough was used in some of the cases to show penetration of the iodine in certain pathological areas to the depth of 1 centimeter into the tissues of the uterus. The most evident symptom of those patients that died was sudden collapse. In two patients in whom the uterus had been forcibly injected with iodine the collapse was extreme and the patients died within five minutes of the injection of the uterus and before the laparotomy could be begun. He did not believe such forcible injection served any good purpose. The injection of the tubes from the fimbriated end and when the abdomen was open, as advocated here by Dr. Stone, was a very different matter and seemed to have no bad effects at the time, and there seemed to be no evidence of unusual adhesions following. The good effects were evident from the reports of pregnancies following the treatment. This seemed certainly to be far more desired than the ablation of both tubes and uterus which would be the rational operative treatment if the attempt was to be made to excise the affected organs.

DR. NEILL used tincture of iodine diluted 50 per cent. to wipe out the vagina and cervix in obstetrical cases and had never seen any iodine toxemia. He commented on the need of eradicating all gonococci from the vagina before it could be promised that the tubes would remain free.

DR. FOOTE asked what the effect of the iodine was on the ciliated epithelium and whether the cilia in the tubes remained active after the treatment with iodine.

DR. STONE in closing, reported one of his first cases with a widespread gonorrheal infection in which he had treated the tubes with bichloride and pregnancy had followed. He had seen the same result after iodine. The size of the uterine cavity determined the quantity of iodine to be injected and he did not try to push the iodine past the cornu from the cervix. He did not think that any of his cases had died. Inhibition of bacterial growth was obtained from solutions of 1 dram of the tincture of iodine to 1 pint of water. He had never found adhesions after the tubal injection. On the other

hand the enucleation of pus tubes left a raw surface to which adhesions were very apt to form. During the tubal injections he was very careful to protect the peritoneum from any undue iodine irritation by folding gauze sponges around the tubes just as he protected the abdomen in removing the appendix.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Effects of State of Nutrition of Mother during Pregnancy and Labor on Condition of Child at Birth and for First Few Days of Life.—Analysis by G. F. D. Smith (*Lancet*, July 8, 1916) of statistics of 6162 cases obtained from the lying-in hospitals of London and Dublin suggests that a state of bad nutrition of the mother at the time of labor due to insufficient food greatly increases the percentage of dead births; greatly increases the percentage of premature births; slightly decreases the average weight of the full-time baby at birth; definitely increases the postnatal infantile mortality; has little, if any, effect during the first eight or ten days on the progress of babies who live during that time; and possibly increases the death rate of babies during the first three or four days of life. A state of good nutrition of the mother at the time of labor, on the other hand, considerably increases the average weight of the full-time baby at birth; and increases the percentage of mothers who are able to suckle during the first eight or ten days of the puerperium, quite apart from any effect from the use of an ample diet during this time. The figures also suggest that on the whole a state of average nutrition of the mother is the most favorable condition.

Action of Various "Female" Remedies on Excised Uterus of Guinea-pig.—Among the drugs listed as unimportant, inactive or useless in the reports of the Council on Pharmacy and Chemistry of the American Medical Association are a number that have been reputed to possess certain "tonic" or "sedative" actions on the uterus, and have been foisted on the medical profession in the form of a long list of proprietary preparations and on the public in the form of "patent" medicines. J. D. Pilcher, W. R. Delzell and G. E. Burman (*Jour. A. M. A.*, 1916, lxvii, 490) present a summary of a preliminary pharmacologic investigation of these drugs on the isolated uterus of the guinea-pig. A strip of the uterus was attached to a muscle lever and immersed in a bath of well-oxygenated Tyrode's fluid and the contractions recorded on smoked paper. On immersion in the bath there is usually a latent period of from a quarter of an hour to an hour before the movements are initiated or become regular; frequently the strips do not become active. After the registration of a satisfactory control tracing, the drugs were added to the bath in proportion of one or two parts of the drug to 1000 of the

bath. The strip remained in the bath until there was evidence either of the activity or inactivity of the added drug. Before a drug was deemed inactive it was left in contact with the strip of uterus for about fifteen minutes, as a rule, but occasionally for an hour or even longer, before renewing the bath and adding a fresh drug. The fluidextracts and the freshly prepared infusions of each drug were employed. The interpretation of the activity of a drug was judged by the change in the character of the muscular contraction. With but one exception, the size of the excursion was the feature affected. The following drugs lessened the amplitude of the excursions or, in the stronger solutions, caused their complete cessation: Unicorn root (*Aletris farinosa*), pulsatilla (*Pulsatilla pratensis*), Jamaica dogwood (*Ichthyomethia piscipula*), and figwort (*Scrophularia nodosa*); somewhat less active were valerian (*Valeriana officinalis*) and lady's slipper (*Cypripedium pubescens*); the drugs possessing very weak actions were wild yam (*Dioscorea villosa*), life root (*Senecio aureus*) and skull-cap (*Scutellaria lateriflora*). The infusions of figwort, Jamaica dogwood and lady's-slipper were active after the manner of the alcoholic preparations, but to a much lesser degree. The infusion of motherwort possessed very insignificant depressant properties, although the fluidextract was inactive. Blue cohosh (*Caulophyllum thalictroides*), even in the 1:2000 solution, very promptly put the strips of uterus practically into a state of tonic contraction of tetanus. The action was very persistent and the normal muscular state was not resumed after the strips were placed in fresh Tyrode's solution. The infusion was quite inactive. The following were quite inactive or inert, both the fluidextract and the infusion: black haw (*Viburnum prunifolium*) the bark of both root and stem, cramp bark (*Virburnum opulus*), squaw vine (*Mitchella repens*), chestnut bark (*Castanea dentata*), false unicorn (*Chamaelirium luteum*), passion flower (*Passiflora incarnata*), blessed thistle (*Cnicus benedictus*), St. Mary's thistle (*Silybum marianum* or *Carduus marianus*) and motherwort (*Leonurus cardiaca*); sodium valerianate was also inactive in solutions up to 1:1000. The strips were allowed to remain in the solutions of these drugs in concentration up to 1:150 for some time (many of them for an hour) without evidence that the drugs changed the character of the tracings in any way. The drugs in this list are practically worthless. Their use is harmful as well as futile since it tends to perpetuate therapeutic fallacies.

GYNECOLOGY AND ABDOMINAL SURGERY.

Nonteratomatous Bone Formation in the Human Ovary.—Speaking of the supposed variety of ossification of the ovary, G. W. Outerbridge (*Amer. Jour. Med. Sci.*, 1916, cli, 868) reports seven cases. As a result of the study of fourteen cases from the literature and of these seven personal observations it appears that true ossification of the ovary may occur independently of any neoplastic or teratomatous process. Such bone formation is probably metaplastic in character; it occurs chiefly in corpora fibrosa or fibrous portions

of the stroma, and particularly in ovaries from cases of pelvic inflammation. In one instance of the personal series it involved the wall of a serous cystadenoma, and in one a spontaneously amputated ovary which was found adherent to the omentum at the bottom of Douglas' pouch, associated with complete atrophy of the corresponding tube. It is highly probable that true ossification of the human ovary, of nonteratomatous origin, is far more common than has generally been believed.

Postoperative Ileus.—W. M. Thompson (*Surg., Gyn. and Obst.*, 1916, xxii, 688) believes that the best results are obtained in the treatment of inflammatory ileus by enterostomy and drainage in cases that are so ill that radical measures would be fatal. Enterostomy should be done rapidly and without disturbing the adhesions. When the patient recovers, ileoileal anastomotic closure of the enterostomy wound and cecostomy or appendicostomy will complete the cure. In favorable cases ileoileal anastomosis with cecostomy or appendicostomy for drainage and to relieve the back pressure in the colon gives the best results. By short-circuiting and putting the damaged gut at rest it may be restored to health and function even after vascular changes have taken place. The mortality of resection for this disease is too high to give it a place in the treatment of inflammatory ileus. The adhesions should not be broken up or the damaged gut handled in the operation.

Etiology of Uterine Prolapse and Cystocele.—G. Fitzgibbon (*Surg., Gyn. and Obst.*, 1916, xxiii, 7) says that the one common item in operations for prolapse of the uterus is plastic work in the region of the lateral fornices and cervix but that the importance of this is not recognized and credit for what is effected by this is given to other parts of the operation which are not essential, while many of the unsatisfactory results are due to nonappreciation of what is the essential part of the operation in cases of prolapse. Prolapse of the uterus and cystocele are due to damage of the pelvic fascia in the region of the lateral fornices and in front of the cervix. Prolapse of the uterus must be clearly differentiated from cystocele; they may exist separately or be combined. Laceration of the perineum and levator ani muscles has no part in the production of prolapse. It allows an increase of cystocele when there is the primary defect. Retroversion of the uterus has no tendency to produce prolapse. Prolapse of the uterus and cystocele are analogous to abdominal hernias through scars, due to defective union of the fascia. The cure of the condition can be effected by reuniting the fascial diaphragm across the pelvis. The fascial diaphragm can be repaired without interfering with the function of the uterus or disclosing the bladder. The condition can be treated in exactly the same manner before and after the menopause. Atrophy of the uterus has no influence upon its support. Amputation of the cervix other than the removal of an hypertrophied lacerated vaginal portion is not necessary.

Vaginal Hysterectomy for Procidentia.—To make better provision against faulty union of the broad ligament stumps, P. E. Truesdale (*Bost. Med. and Surg. Jour.*, 1916, clxxv, 13) includes a strip of uterine muscle on either side, making an apposition of the broad

ligaments with a strip of uterine muscle to form a central body of support. This, in many cases, will serve to fortify a weak step in the operation as usually done. The procedure differs from the operation described by Watkins, inasmuch as the entire cavity and elongated cervix are removed. Analysis of fifty cases, in which this was done for procidentia, shows that the average duration of symptoms was five years. In forty-two cases the procidentia was complete; in eight, incomplete. The results were complete success in 74 per cent., partial success in 12 per cent., and failure in 6 per cent.

Relation of the Endometrium and Ovary to Hemorrhage from Myomatous Uteri—In an attempt to correlate various theories especially in the light of recent contributions to the physiology of menstruation and its relation to corpus luteum evolution, S. H. Geist (*Surg., Gyn. and Obst.*, 1916, xxiii, 68) studied seventy-five fibromyomatous uteri, representing all types of tumors and presenting various symptoms. In all the cases the menstrual history was accurately investigated. In sixty cases the adnexa were also examined. Of the seventy-five cases, fifty gave a history of menorrhagia, some few also having metrorrhagia. In most of the cases of fibroid uteri associated with pathological bleeding a hypertrophic condition of the mucosa. The ovaries in these cases vary from the normal, there being present most often a large corpus luteum, occasionally cystic. These findings seem very significant in view of the fact that the ovarian influence is of primal importance in regulating the normal hemorrhage from the uterus, and it seems reasonable to suggest as a possible etiological factor for the atypical hemorrhage associated with fibroids, disturbance in the function of the ovary, perhaps of the corpus luteum.

Process of Repair in Wounds of the Small Intestine.—This investigation by J. E. McWhorter, A. P. Stout and C. C. Lieb (*Surg., Gyn. and Obst.*, 1916, xxiii, 80) has a bearing upon the administration of fluid and food after intestinal operations. The following conclusions based on the data obtained from operations on the normal and the gangrenous small intestine of the dog, are grouped together for the reason that in both series the experiments were the same and the end-results identical. The noninfected suture line in the small intestine in dogs is very resistant to internal hydrostatic pressure. For at one hour after operation and any time thereafter, the area of operation is capable of withstanding an hydrostatic pressure of over 1 pound per square inch without leakage. The clinically infected specimens leaked at minimum pressures. To obtain perfect results a proper technic is essential. For it is seen that in a dog recently killed the intestine, when properly sutured, is capable of withstanding a pressure of nearly 2 pounds per square inch without leakage. Imperfect technic results in a defective suture line. The defects, if not too extensive, may be sealed by the coagulum which probably prevents leakage. The smooth muscle of the divided and sutured intestine retains its viability and segmenting function to within 5 mm. of the line of suture. In an infected case with gangrene around the suture line, no segmentation occurred within 15 mm., while 60 mm. away contractions were

powerful and well defined. Repair in sutured intestinal wounds begins at once with the coagulation of the extravasated blood which fills in the space between the two approximated serous surfaces. This union becomes permanent in from seven to ten days, with the replacement of the coagulum by connective tissue. Repair of the mucosa is first seen after twenty-four hours beginning with a line of syncytial epithelial cells extending from the edge of the viable mucosa over the denuded surface of the infolded cut edges of the intestinal coat. The denuded surface may be covered with an immature mucosa as early as the fifteenth day (Mall), but it is usually not completely covered until twenty-three days after operation. Regeneration of the mucosa is complete after two months. Complete anatomical regeneration of the muscularis does not occur. A realignment of the infolded muscular fibers occurs, but it is always interrupted by a thin line of scar-tissue. From the above data the writers conclude that fluid and food may be given immediately after operation without danger of leakage in the sutured small intestine. If leakage does occur, it is due to infection or faulty operative technic.

ITEMS

A WARNING.

WE are again obliged to call the attention of our readers to the taking of subscriptions to *THE AMERICAN JOURNAL OF OBSTETRICS* the *Medical Record*, or the *British Journal of Surgery*, by unauthorized persons. There has for a long time been an organized band of these rascals working the cities and larger towns in many sections of the country. We would warn our present subscribers not to give money for renewals to any but our authorized agents, or preferably (as a forged authorization may be presented) to send it direct to the subscription department of the journal. As to intending new subscribers, we are doing our best to protect them by notifying the police of the cities where these gangs of sharpers are working.

ARMY MEDICAL CORPS EXAMINATION.

The Surgeon General of the Army announces that preliminary examination for appointment of first lieutenants in the Army Medical Corps will be held early in January, 1917, at points to be hereafter designated.

Full information concerning this examination can be procured upon application to the "Surgeon General, U. S. Army, Washington,

D. C." The essential requirements to secure an invitation are that the applicant shall be a citizen of the United States, between twenty-two and thirty-two years of age at time of receiving commission in Medical Corps, a graduate of a medical school legally authorized to confer the degree of Doctor of Medicine, of good moral character and habits, and shall have had at least one year's hospital training as an interne, after graduation. Applicants who are serving this post-graduate interneship and can complete same before October 1, 1917, can take the January examination. The examination will be held simultaneously throughout the country at points where boards can be convened. Due consideration will be given to localities from which applications are received, in order to lessen the traveling expenses of applicants as much as possible.

In order to perfect all necessary arrangements for the examination, applications should be forwarded without delay to the Surgeon General of the Army.

There are at present 228 vacancies in the Medical Corps of the Army.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of May 11, 1916.

ROYAL STORRS HAYNES, M. D., *in the Chair.*

DR. C. T. SHARPE reported a case of

MENINGOCOCCUS MENINGITIS WITH UNUSUAL HEMORRHAGIC MANIFESTATIONS AND DEMONSTRATION OF THE DIPLOCOCCUS IN THE SKIN.

The patient was a little Hebrew girl three and a half years old, who presented a widespread purpura with a remarkable vermilion border in the larger areas. The suffusions involved the face, left arm and buttocks and occurred also in the mouth. The petechiæ were present all over the body and on the buccal mucous membrane. There was little evidence of involvement of the meninges of the brain and cord and the diagnosis would have remained in doubt had there been no other evidence of the infection.

The spinal fluid, the blood culture and the skin sections were shown to contain the meningococcus.

The interrelationship between the cutaneous manifestations and the cerebrospinal involvement, that is, *the inverse variation*, was dwelt upon and the author advanced the importance of this as a prognostic sign and instanced cases where cerebral compression—which he referred to as *cerebral edema*—had been relieved by the occurrence of cutaneous eruptions.

DR. JESSE F. SAMMIS.—This patient, a child nine months of age, was presented to us on February 28, 1916, having as the chief complaint inability to hold up the head. The patient was the youngest of four children, the others being perfectly normal both in physical and mental development. The parents were well, with no symptoms of either tuberculosis or syphilis. The child was born at eight and three-fourths months intrauterine life, the weight at birth being given as 12 pounds. The labor was difficult and the child extremely

cyanotic, having been resuscitated with difficulty. The child had had whooping-cough and this was followed by some eruption of the skin, probably chickenpox. The child had been exclusively breast-fed and the digestion had been perfectly normal. It was not until the child was four months old that anything abnormal was thought of, and then it was noticed that the head appeared to be increasing in size very rapidly and that the child was making no effort to sit up. At nine months he was able to hold up his head but not to sit up. He plays and laughs in a normal way and seems almost as happy as other children of his age. He is presented because he exhibits nearly all the characteristic deformities of achondroplasia in a typical way. The disproportion between the length of the trunk and the extremities is marked, the hands scarcely reaching to the waist line, the skin, owing to the shortness of the lower extremities hangs in folds, he shows the prominent forehead with the saddle nose and the protruding jaw. The abdomen is prominent and an umbilical hernia is present. There is a slight lateral curvature of the spine and a kyphosis. The hands are quite characteristic, being the kind designated as "trident." There is considerable relaxation of the ligaments and the child's muscular development is poor. The liver and spleen are both easily palpable. The Wassermann is negative. The measurements are as follows: Weight, $13\frac{1}{2}$ pounds; length, 24 inches; crown of the head to the umbilicus, $13\frac{1}{2}$ inches; umbilicus to the sole of the feet, $10\frac{1}{2}$ inches. Head, $18\frac{1}{2}$ inches; chest, $14\frac{1}{2}$ inches; abdomen, $14\frac{1}{2}$ inches. Measurements of the upper and lower extremities showed them to be unusually short.

AUTOSERUM TREATMENT OF CHOREA.

DR. ABRAHAM L. GOODMAN.—Whenever I want to find out about anything new it is my custom to go back to Hippocrates, Gelen and Paracelsus and find out what they knew about it. I cannot find that they knew anything of the condition which we to-day interpret as chorea. The first mention of this disease which I can find in history are accounts of epidemics in the region of the Rhine in Germany, in 1386. At this time large pilgrimages were made to various shrines for the cure of St. Vitus dance. At that time the disease seemed to be a contagion or one related to hysteria. It remained for Huntington and Sydenham to give us the description of the disease which we know as chorea to-day.

The first etiological investigation of chorea was made by Wassermann and he has spoken of finding a streptococcus which he believed might be the cause of chorea. He isolated this organism from a group of individuals who had choreiform movements. It may be said, however, that up to the present time no distinctive organism had been demonstrated as the cause of chorea. Koplik reports a number of cases that were syphilitic and whose blood showed a positive Wassermann reaction. Le Fetra has reported two cases in which the streptococcus viridans was isolated. This is about the extent of our researches into the etiology of chorea and the literature

on the subject is not extensive, so its causation is very doubtful at the present time.

My attention was attracted to the subject by two cases admitted to the German Hospital with a diagnosis of chorea. These choreic movements were augmented to a high degree in a short time and the child developed an intense coma, and it was suspected that we were dealing with a miliary tuberculosis restricted to the central nervous system. All the usual forms of medication were tried but nothing seemed to reach the source or origin of the disease. In 1913 it occurred to me that if we could use the serum of a patient with chorea and inject it into the spinal column we might obtain some favorable results; that possibly the enzymes or protein bodies might be a factor in the disease. We realized the dangers of this proposed procedure and made cultures of the blood and spinal fluid, and in none could we demonstrate any organism of any kind. Shortly afterward the use of salvarsanized serum gave added encouragement to any doing work along these lines, so while we could not predict the results we determined to try it. The first case was the one I have mentioned with coma. We felt that we would lose the case and that the use of the serum was justified, as the child had received large doses of codeine, chloral, etc., without effect. We used this method and the child became quiet within two days. Passanini has treated five cases by withdrawal of the spinal fluid but this method was not successful, at least it would seem that he had not met with success because we have seen no further report from this author. We thought, therefore, that we would try another method. We then learned of the work done with magnesium sulphate, in which a 25 per cent. solution was injected, in 1 or 2 c.c., intraspinally for 15 kilos body weight. We have not had enough experience with this method to be in a position to compare it with the results of treatment with autoserum. We must be sure that our case is one of chorea and not every case with choreiform movements is one of true chorea. In illustration of this, we had one girl with a slight enlargement of the thymus but without any accompanying murmur; she had a hypothyroidism rather than a hyperthyroidism. We gave her thyroid extract and the choreic movements disappeared entirely. In the treatment of these cases of chorea with autoserum another important factor is to be sure that all drug medication has been eliminated. To be sure that a treatment in chorea is effective it must give a quick result; if it is slow in producing an effect, say two or three weeks, one cannot be sure that the disease has not been self-limited. With the autoserum the result is manifested within two or three days so we can be sure that they are the immediate effect of the injection of the autoserum.

Our method is briefly this: We let the child lie in the ward three or four days and in the meantime make sure that other infections, such as syphilis can be excluded. We then withdraw 45 or 50 c.c. of blood and centrifuge it. The serum is then pipetted off, transferred to beakers and kept two hours at room temperature. Then we do a lumbar puncture and withdraw 20 c.c. of the spinal fluid. The serum is then taken from the incubator and very slowly injected

into the spinal cord allowing ten to fifteen minutes to inject 15 c.c. It is important that the injection should be made slowly so as not to disturb the equilibrium. The patient is then put to bed and there is no immediate reaction. At times there may be a little rise in temperature but this is exceptional. We have had no serious results from this treatment, and we have made from twenty to twenty-five such injections. It is amazing to see how quickly these cases respond to this treatment. Dr. Smith at the Vanderbilt Clinic had a case that had been growing worse for three months. The child exhibited most violent movements and after two injections was cured and discharged.

At the present time we are trying to find out wherein the actual value of the procedure lies, whether it is due to an antibody or an enzyme or a protein or what. In the meantime any remedy that will relieve this distressing malady is worthy of our careful consideration.

DISCUSSION.

DR. SAMUEL FELDSTEIN.—At the Brooklyn Jewish Hospital we recently treated a case of chorea by Dr. Goodman's method with most amazing results. A girl of thirteen years had begun two months ago to suffer from rheumatic polyarthritis which necessitated her stay in bed for three weeks. After ten days' relief she was again compelled to take to bed on account of the recurrence of the articular symptoms. Three days previous to admission, she was seized with severe choreic movements; these being so violent at the time of admission that a thorough physical examination could not be made. Temperature 100.4, pulse 120, respirations 26. There were signs of a mitral regurgitation. We observed the patient for three days, being compelled to give dionin gr. $\frac{1}{8}$ at night for the extreme restlessness. During this time the condition became more aggravated. We then removed 40 c.c. of blood from an arm vein and kept it at room temperature, allowing the serum to separate spontaneously. Most of the serum was clear, the remainder we centrifuged. We then removed about 20 c.c. of fluid from the spinal canal and injected 10 c.c. of the serum. Following the injection, there was considerable reaction, rise in temperature to 102° F., headache and rigidity of the neck. These symptoms disappeared the next day. The day after the choreic movements were greatly lessened, and by the third day had largely disappeared. A week later we repeated the injection, this time allowing the serum to separate spontaneously over night at room temperature. The second treatment was followed by a much milder reaction. A few days later the patient was practically free from spontaneous choreic movements. I saw the patient yesterday in the dispensary and found no signs of chorea.

DR. CHARLES H. SMITH.—I saw the case of chorea to which Dr. Goodman has referred and if he cured that case he preformed a miracle, for it was the most severe case of chorea I ever saw. Every attempt had been made to alleviate the condition of that child. It had received maximum doses of salicylates, bromides, chloral,

arsenic and tonics and it scarcely seems possible that he was able to cure it.

DR. RUDOLPH MOFFETT.—I have been associated with Dr. Goodman at the German Hospital and have observed this treatment, and I can only say that it works wonderfully. After injecting a case it clears up within a few days. We have been using 10 c.c. in making the injections, I think we should use 15 c.c. and that we might thus avoid the necessity of giving a second injection.

OBSERVATIONS ON TUBERCULOSIS AT THE VANDERBILT CLINIC.

DR CHARLES H. SMITH and DR. H. LAMBERT BIBBY.—When a child is brought to us for examination there are two questions which we always ask. These are: (a) Has the child been infected with tuberculosis? This question is answered by the skin test. (b) Is the infection latent or active? We prefer the terms latent and active rather than infection and disease, believing the former are more accurate since all infection means disease. And furthermore because in an infected child small latent foci remain waiting for favorable conditions to flare up.

A latent tuberculosis is shown by a positive von Pirquet test and no symptoms or signs of the disease. An active tuberculosis in a child is not like incipient tuberculosis in the adolescent or adult. In the child the lesion is not apical, often not pulmonary, but by node or hilus infiltration. This makes diagnosis extremely difficult and quite different from making a diagnosis in the adult. The diagnosis is based on symptoms of impaired nutrition and anemia, undersize, and failure to gain in weight at the proper rate. The presence of an irregular fever lasting over a considerable period of time is very suggestive. Other symptoms that are valuable are anorexia, fatigue, languor (or in some cases the fever seems to incite the child to unusual activity), headache and night sweats. In children cough and positive chest signs are rare, but there may be transient bronchitis, asthmatic bronchitis or enlarged bronchial lymph nodes.

The frequency of these various symptoms in a series of 80 cases giving a positive von Pirquet reaction were as follows: Fever in 16 instances; no gain in 9; loss of weight in 7; failure to gain when at rest in 3. Among these 80 cases 21, or 25 per cent. had tuberculosis in the active stage and all were without the signs of the disease.

With reference to the von Pirquet test there are several points to be observed. It is better to perform the test with a scarifier as one is not so likely to draw blood in this way. The skin should be properly sterilized before making the inoculation and should be allowed to dry before the dressing is applied. A protective dressing should be applied to protect the puncture from contamination from clothing or finger nails.

As has been said the physical signs in the lungs are rare. We found such signs in only 21 out of 150 cases. Dulness is difficult to detect and uncertain. The physical signs observed in these 21 cases were as follows: Transient localized râles at the apex in 1 case with a positive von Pirquet; localized râles in the axilla in 3 cases,

2 with a negative and 1 with a positive von Pirquet; general bronchitis (accidental) in 2 cases, 1 giving a positive and 1 a negative von Pirquet; asthmatic bronchitis in 5 cases, all positive; pleurisy in 4 cases, all positive; consolidation with cavity formation in 4 cases, 3 giving a positive and 1 a negative von Pirquet reaction, and 2 cases with pertussis. This gave 21 cases, or 14 per cent. out of 120 in whom there was a probability of tuberculosis; the larger number of these gave a positive von Pirquet reaction but some gave a negative reaction.

The signs of involvement of the bronchial lymph nodes are dulness, tender spines and d'Espine's sign. Enlarged bronchial lymph nodes and infiltration of the hilus cause an increased conductivity of the sounds but this sign is not pathognomonic. There is some confusion as to just what is meant by d'Espine's sign and it is better to say whispered bronchophony to a given vertebra than to say d'Espine's sign positive. There are certain points to be observed in eliciting d'Espine's sign. The room must be quiet; it cannot be done in the dispensary room or where persons are walking about and talking. The child must be able to whisper well; it is, of course, difficult or impossible to get the coöperation of the child under the age of three or four years. It is well to listen rather high in the cervical region and low in the dorsal and then to continue listening above and below until the line is reached in which the tracheal sound changes to the vesicular. This point varies considerably in different subjects.

The x-ray as a means of making a diagnosis is either a brilliant aid or a great disappointment. In order to get information one must get a good x-ray with a short exposure. When there is a positive tuberculous infection the x-ray may show enlarged bronchial nodes, or tracheobronchial involvement by large central shadows, or small nodes may be shown along the main bronchi. Small dark shadows well separated from the root shadows are very suspicious. Pleural thickenings may be noted which may be interlobar or from old pleural effusions or infiltrations. There may be a fibrosis extending out from the hilus region, but it must be remembered that there are variations in the hilus shadows normally present. The x-ray may show consolidation or cavities but it has been found that the cavities are usually much smaller than the signs would indicate.

In regard to the treatment we may briefly say that children with latent tuberculosis need watchful care, extra rest, air and food. Children with symptoms of active disease should be put to bed in the open air with careful feeding and kept in bed until the temperature becomes normal. They must be watched with great care for months and years in order to detect any signs of relapse.

At the present time we have insufficient preventoria and sanatoria; for all children with positive von Pirquet reactions need careful watching. If such a child runs a temperature and does not gain properly, he should be considered as needing the same care and treatment as any active case of tuberculous disease, since the diagnosis of early tuberculosis is too difficult in the child and the danger of extension to the lungs and other parts of the body too great to take

chances. At the present time our sanatoria take only children from homes in which there are men or members with tuberculosis but make no provision for the child accidentally infected from some other source.

DISCUSSION.

DR. FRANKLIN MORRIS CLASS.—I agree with everything that Dr. Smith has said. I see many of his patients in the Vanderbilt Clinic Day Camp and see what he accomplishes. The most difficult cases to diagnoses are the early cases of tuberculosis in children under twelve years of age. I am also convinced that most children suffering from early tuberculosis show no signs in the lungs; and those cases showing pulmonary signs, generally suffer from an infection other than tuberculosis. It is especially difficult to make a diagnosis in a dispensary as one has to see each case over a considerable period of time.

DR. LEON T. LEWALD.—The problem of making a diagnosis of early tuberculosis in children is just as hard for the röntgenologist as for the one who bases his diagnosis on physical signs. There may be a small focus in a bronchial gland which the x -ray does not readily show. Dr. Smith says that a latent focus of tuberculosis is always dangerous and it is wise to call this "latent" rather than healed tuberculosis.

As to d'Espine's sign, there is considerable variation in the vertebræ and that explains the difficulty in the location of the sounds.

It is also difficult to determine the presence of a small focus as the shadow of the cross-section of a bronchus may be mistaken for an enlarged gland. It is advisable to have stereoscopic radiographs not only in one plane, but taken at different angles, at right angles and at oblique angles.

DR. MAURICE FISHBERG.—I want to mention an important point which seems to have been omitted in the discussion of the d'Espine sign. In interpreting the findings of tracheophony we must bear in mind certain anatomical peculiarities of the bifurcation of the trachea mainly according to the age of the patient. In infants under three years of age the bifurcation is on a level with the seventh cervical vertebral spine, but with advancing age it sinks lower and lower. At the age of eight it is on a level with the third dorsal vertebral spine, and at twelve years of age it is as low as the fourth dorsal spine. In adults it may be as low as the fifth or even the sixth dorsal vertebral spine. Under the circumstances the sign is positive in a child under three when tracheophony is heard in an infant under three lower than the first dorsal vertebra; in a child of six the sign is negative when tracheophone is audible above the third spine. In a child of twelve tracheophony may be audible as low as the fourth or fifth dorsal spine without enlarged thoracic glands. In many children this sign is negative though the glands are enlarged because the trachea is situated more anteriorly than normally, or only the anterior glands are tuberculous. After all it is due to the interposition of anything between the trachea and the spine, and tuberculous

glands are the most common in childhood. In adults we may find tracheophony on rare occasions as low as the lumbar vertebræ with or without being able to assign a plausible cause to the phenomenon. In children, if the anatomical points just mentioned are not borne in mind the sign is of little value.

DR. L. EMMETT HOLT.—With regard to the von Pirquet reaction in tuberculous meningitis, I think the impression has gained currency that it is only exceptionally that we get a positive von Pirquet reaction in that disease. It has been our experience that except in the last stages of the disease when the patient is extremely prostrated, the skin test has almost always been positive. At other times a negative test may be of great value. This is illustrated by the case of a child who was admitted to the hospital because the mother had noticed a lump of the head. This proved to be a bulging fontanel. There was a history of convulsions, fever and drowsiness. A lumbar puncture was done and 120 c.c. of perfectly clear normal fluid withdrawn. In this instance the von Pirquet test was negative and the child recovered. The symptoms in this case pointed to tuberculous meningitis but the child certainly did not have that disease. It probably belonged to that type of meningitis sometimes called serous meningitis.

As to d'Espine's sign, I have been impressed by the extreme variability of the sign in different children. I do not believe it is possible to fix on any one point and say this is the exact point at which the whispered voice is significant. It is a valuable diagnostic sign for diagnosis and is usually best obtained on the right side.

Early wasting is often absent with active tuberculosis in infancy. One may see a child with fairly positive signs of tuberculosis and yet the child will show no loss of weight for a considerable time; and a child may have a fairly active tuberculosis and even gain weight. Loss of weight in young children is not so significant in tuberculosis in young children as in older ones. Most of the infants with tuberculous meningitis are rosy and plump up to the time when active symptoms of meningitis develop.

DR. ABRAHAM L. GOODMAN.—One point that has impressed me is the difference between tuberculosis in very young children and those between the age of ten and twelve years. I have been amazed to see how well nourished these young children are, and how extensive the tuberculosis often is without any particular objective sign. In older children these objective signs are usually present. Most of these younger children have enlarged bronchial lymph nodes and the von Pirquet reaction is usually positive. These cases of early tuberculosis exhibit indefinite fevers accompanied with gastrointestinal disturbances, and are treated often as such until the condition has been recognized. Every case of indefinite fever in early life should be looked upon as a possible tuberculosis, and with the added refinement in technic and execution in detail of x-ray examination, the early appreciation of tuberculosis is made possible. When one finds these enlarged mediastinal glands together with a von Pirquet reaction and an increased temperature from time to time, I believe one is justified in making a diagnosis of incipient tuberculosis. I

believe that when such children are placed under proper hygienic and sanitary conditions, and are given daily doses of guaiacol and arsenic for years, that they can be permanently cured. Guaiacol and arsenic not only favorably influence a tuberculous process in the lung, but have a direct influence on the process of metabolism.

DR. SMITH, in closing the discussion.—With reference to d'Espine's sign and the breath sounds, it is difficult to get a child under two years old to whisper; one cannot usually get a child under three or four years of age to whisper properly. And by the time a child is three or four years of age the bifurcation of the trachea is approximately as far down as at the age of twelve years. There must be some significance in these signs, for one gets the d'Espine sign as low as the fourth or sixth dorsal vertebra and on the other hand there are a large number of cases in which it stops at the first dorsal or seventh cervical vertebra. So that it seems that it must have some significance, though undoubtedly it does occur without the presence of tuberculosis but the figures with reference to its occurrence are certainly suggestive.

TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.

Sixty-seventh Annual Session, Held in Detroit, Mich., June 13, 14, 15, 16, 1916.

SECTION ON DISEASES OF CHILDREN.

T. C. McCLEAVE, M. D., of Oakland, Cal., in the Chair.

DR. T. C. McCLEAVE delivered the President's Address on

DENTAL CARIES IN CHILDHOOD; THE MOST NEGLECTED FEATURE IN PEDIATRIC MEDICINE.

Modern medicine is concerned with the prevention of disease and nowhere is there a wider field for the exercise of this function than during childhood. A preventive measure of prime importance is the care of the teeth. Unfortunately many dentists do not realize the importance of caring for children's teeth. They argue that it is not worth while caring for the deciduous teeth, and in reply to the statement that neglect of the deciduous teeth may result in permanent deformity they reply that the permanent teeth may be deformed anyway. Ignorance is the greatest obstacle in the way of securing proper dental care. Dental deformities frequently mean much more than merely deformities of the teeth. They may be responsible for deformities of the face and jaw, and they may be a factor in the production of adenoids, nasal hypertrophy, and tonsillar enlargements. The selection of a proper dietary has an im-

portant bearing on the development of the teeth. Malocclusion interferes with proper mastication and is therefore the starting point of many nutritional disorders. The digestion of starches cannot be normal if mastication is imperfect. Infections of the teeth cause dental caries and pyorrhea. The chemicobacterial theory is now generally accepted as explaining the causation of caries. On this theory caries is attributed to a fermentative process. Particles of carbohydrate food become lodged in the crevices of the teeth, fermentation takes place, and the acid products of the fermentation attack the enamel of the teeth. Hence the soft, sweet, sticky foods of which children are so fond may be regarded as a cause of dental caries. It has been found that pyorrhea alveolar almost always causes other infections. There is a definite relationship between pyorrhea and the various focal infections with which we are all familiar. The first step toward the relief of the present situation is to make the medical profession realize the significance of dental hygiene. Their interest must be stimulated so that they will undertake to awake a general interest in this subject in their own communities. The dentist must come to realize that he is not merely an artisan and a mechanic, but that he is working in a definite field of medicine and that the care of the teeth of children is of sufficient importance to merit his most careful consideration. Parents must be made to realize the importance of proper development and care of the teeth in children and must be taught that such care is worth paying for. Proper provision should be made for the care of the teeth of children whose parents are unable to pay for this service. Every clinic for children should recognize that a dental department is an inherent part of its organization.

DR. JOHN LOVETT MORSE and DR. DAVID M. HASSAM, Boston, presented a paper on

THE EFFECT OF COLD AIR ON THE BLOOD PRESSURE IN PNEUMONIA IN CHILDHOOD.

The cold air treatment of pneumonia has been generally adopted during recent years. It has been believed that the blood pressure was diminished in severe and fatal cases of pneumonia and that the good effects of the fresh air treatment were due to the fact that the blood pressure was raised by this treatment. More recent investigations have shown, however, that there is no constant rule for the blood pressure in pneumonia and considerable doubt has been thrown on the statement that the blood pressure in pneumonia is increased by exposure to cold air. The writers have made a study of the effect of cold, out-of-door air on the blood pressure in pneumonia in childhood, at the Boston Children's Hospital, during the past winter. Three hundred and eighty-seven observations were made on thirty-two children. These observations showed that the temperature of the surrounding air has no constant effect on the systolic pressure, the diastolic pressure or the pulse pressure and the severity of the disease. The rates of the pulse and respiration were also counted in many instances at the same time that the blood pressure was taken

to determine, if possible, what effect the temperature of the surrounding air had upon them. In general, the temperature of the surrounding air had no constant effect on the rate of the pulse or respiration. There was, however, a slight tendency for the rate of the pulse and respiration to be somewhat lower out of doors than in the wards. The mortality was high in this series of cases. A study of the cases of pneumonia, treated at the Children's Hospital since its foundation, by Cunningham, shows that the mortality has been slightly higher since the institution of the cold air treatment: The following conclusions are warranted: There is no constant relation between the systolic, the diastolic or the pulse pressure and the severity of the pneumonia or the temperature of the surrounding air. The rates of both the pulse and the respiration show a tendency to vary directly with the temperature of the surrounding air. The patients symptomatically seem more comfortable when they are out of doors than when they are in the house. No conclusions are justified as to the effect of cold air treatment on the mortality of pneumonia in children.

DISCUSSION.

DR. HENRY DWIGHT CHAPIN, New York.—Babies with bronchopneumonia do not do well when treated out of doors. Some years ago we put all pneumonia cases out of doors but we found that the children with bronchopneumonia were depressed by this treatment. We must make a distinction between bronchopneumonia and lobar pneumonia. Something should be said against treating feeble babies with cold air.

DR. HENRY KOPLIK, New York.—General practitioners have been very prone to treat babies with pneumonia in the open air. There are certain babies that should not be put in the cold air; they should have fresh air but not cold air. On the other hand, there are babies that become restless in the ward and from the clinical standpoint they may sometimes be improved by being placed in the open air. The point to be made is that the cases must be picked. Some babies with lobar pneumonia are benefited by crisp cool air if they are well wrapped up and their hands and feet kept warm, but others are injured if they are in too cold an atmosphere.

DR. E. E. GRAHAM, Philadelphia.—In Philadelphia we have been treating both forms of pneumonia in ward rooms of the roof garden where the children receive an abundance of fresh, cool, moving air. My experience teaches me that provided we can keep the children's hands and feet well bundled up the cold air never does harm and sometimes it does good.

DR. L. R. DEBUYS, New Orleans.—Cases of lobar pneumonia do better with plenty of fresh air. I have been impressed by the shortness of cases of pneumonia both bronchial and lobar when treated with oxygen. We have been administering oxygen, giving eighteen drops per minute during the treatment, and find that the duration of the disease has been much shortened in this way; this is giving the outdoor treatment indoors.

DR. JOHN ZAHORSKY, St. Louis.—Several years ago in St. Louis we used cold air in the treatment of babies with pneumonia with disastrous results. Clinically there is generally an improvement and the child seems to feel more comfortable in cool air but not necessarily cold air. On the other hand, cold air appears to be harmful in some cases. I feel inclined to report a case in which there was a low blood pressure and a relatively weak heart. This child was placed in the cold air and after being out of doors for a few moments the heart stopped, and the parents still blame me for the death of that child. Cold air should be used with a great deal of care and while the babies appear to feel better in cool air I feel that cold air is harmful.

DR. CHARLES GILMORE KERLEY, New York.—When we deal with cold air we are dealing with a therapeutic agent and while it may be used with benefit in some cases, it is like all other therapeutic methods; it must be applied according to the indications in selected cases. In small babies with bronchopneumonia and with a tendency to spasm the use of cold air may be attended with a great deal of danger, while in a husky child with lobar pneumonia it may be productive of much benefit. We cannot draw any conclusions with references to cases of pneumonia as a whole, but the cases must be carefully selected, and after the cold-air treatment has been instituted the children must be carefully watched.

DR. C. G. GRULEE, Chicago.—I cannot discuss the paper but I may discuss the discussion. It seems to me that we may briefly state that the keynote of the matter lies in the selection of cases.

DR. ST. GEORGE T. GRINNAN, Richmond, Va.—I feel that usually cases of bronchopneumonia in children under eight months of age do not do well in extremely cold air but older children with lobar pneumonia are greatly benefited by cold air.

DR. E. C. FLEISCHNER, San Francisco.—I think Dr. Grulee is right when he says the keynote of the matter is the selection of cases. In California practically all the cases of lobar pneumonia get well if put out of doors but our type of pneumonia is not as severe as that in the East. The same thing is true with reference to bronchopneumonias in California as elsewhere; they do not do so well when put out in the cold air.

DR. JOHN LOVETT MORSE, Boston.—This paper dealt with lobar pneumonias and not with bronchopneumonias and the results of the observations recorded cannot be taken as either for or against the cold air treatment of pneumonia. Our children were all older children with lobar pneumonia.

DR. LAWRENCE T. ROYSTER, Norfolk, Va., read a paper on

GRIP IN CHILDREN.

This paper is the result of my personal experience with grip last winter. Grip is always endemic but at times it becomes epidemic and then it assumes a more severe form. The prevailing type of grip is characterized by a sudden onset, and a rise in temperature lasting from two to five days, ranging from 102 to 105 or 106° F

When there is a sudden onset, high temperature, and great prostration it is sometimes difficult to distinguish this form of grip from pneumonia during the first day or two. The pulse and respiration are often not greatly interfered with. Older children may complain of pains in almost any part of the body which are described as sharp, violent and boring. A marked feature in a few cases was irregular heart action and a few of these cases proved fatal. One form of grip was characterized by bronchitis, laryngitis, and coryza and resembled measles. There was also a type of case characterized by persistent vomiting. This type had been taken by some physicians for cyclic vomiting, but it was of short duration and the evidence of diacetic acid in the urine was very slight. To the writer diarrhea as a complication of grip was a new experience; it differed in no way from the type of diarrhea so common in summer. It was not of the cholera infantum type and it did not follow the catarrhal type in any instance. Some of these cases convalesced rapidly; in others convalescence was long drawn out, and in others again, there were exacerbations or reinfections. In some cases there was an irregular pulse very suggestive of myocardial involvement. Among the complications encountered were bronchitis, pneumonia, otitis media, and pyelitis. These latter infections might have existed, probably did exist before the grip developed, but the lowered degree of resistance gave these other infections an opportunity to develop. In some cases there was a peculiarly harsh, distressing and persistent cough; in some Despine's sign could be elicited. A positive von Pirquet reaction was quite frequent in these children. It may be said that grip is only second to measles and whooping-cough as an inciting cause of tuberculosis. As a prophylactic measure against grip children should be kept from older persons having the disease. A mother suffering from grip should cover her mouth and nose while nursing her infant. It is also well to protect young children from dry windy weather. I have been using sodium salicylate in the treatment of grip and prefer the natural to the synthetic product. In the catarrhal conditions I use a preparation of menthol, camphor and white oil. In cases of severe bronchitis with exhausting cough opium should not be withheld. The cases with diarrhea should be treated as we treat summer diarrhea. When there is a persistent cough, lasting for a long time after the attack, codliver oil and hygienic treatment are indicated. Many of these patients in spite of all care continue to cough until warm weather comes. Grip should be a quarantinable disease; especial care should be exercised to exclude it from the schools.

DISCUSSION.

DR. ISAAC ABT, Chicago.—This paper suggests the question of the etiology of grip and of what a study of its bacteriology has shown. In studying its bacteriology every kind of organism has been found, virulent, nonvirulent, specific and nonspecific. Unless the bacillus of influenza is so illusive that it cannot be identified we may conclude that the study of the bacteriology of grip during the past

winter has thrown very little light on the etiology of the disease. Seasonal or weather conditions seem to be a determining factor in the incidence of grip. We may ask why there is so much grip in February and March and why it disappears when the sun comes out and then reappears again with damp cloudy weather. We may ask why it disappears entirely during the summer months. Sometimes babies are sent out of doors in winter when the weather is unfit for an adult to be out. I have known of instances where a baby has had grip and was doing well but on being sent out suffered a severe exacerbation of the disease. It seems to me that the evidence points to a seasonal or weather influence in relation to the incidence of grip. Very often the disease starts with vomiting and the vomiting is the expression of a general toxemia brought about by the grip infection, and in addition to the vomiting one gets symptoms referable to the nasal mucosa and the nasopharynx and tonsils or some complication of the middle ear. So far as the cough is concerned it is often out of proportion to the bronchial involvement. The x-ray may show enlarged bronchial or mediastinal glands and where there is no positive von Pirquet reaction these are due to something else than tuberculosis. In relation to the pyelitis, this occurs very frequently following grip, especially in children who have had pyelitis before. In the treatment of this condition urotropin is often used. This agent should not be used in children under the age of three years, as it is often responsible for a nephritis in such young children. I believe that nephritis is not so often due to the organism causing the grip as it is to the use of urotropin.

DR. JOSEPH BRENNEMANN, Chicago.—While I see a number of cases with symptoms almost exactly like those described there are two symptoms which stand out conspicuously, namely, abdominal pain and hemorrhage, frequently into the intestinal wall. When I am told that a child is complaining of pain in its stomach I always look into the throat or look for an otitis media. I know of several cases in which the patients complained of abdominal pain and were operated on for appendicitis; in one of these the glands were very much enlarged and in two others there was hemorrhage into the intestinal wall and the trouble had begun with sore throat. The tendency to hemorrhage is very marked in a number of cases. There also seemed to be a relation between the grip and certain exanthema. During the spring there were a large number of cases with a scarlatina form rash and it was difficult to tell whether these were cases of scarlet fever or not.

DR. JAY I. DURAND, Seattle.—We had the same kind of an epidemic in Seattle last winter and we saw all types of cases. I believe that grip is a clear-cut, clinical entity. I believe it is purely a respiratory form of infection and we must prevent its spread as we prevent other forms of respiratory infection from spreading. In the hospital we found that if the beds were 3 feet apart, had a double gauze partition between them, and drafts were prevented the infection was not spread from one bed to another. In wards in which these precautions were not taken every child in the ward would get the infection.

DR. N. S. EVERHARD, Wadsworth, Ohio.—We had an epidemic of grip in Dayton last winter. Since in grip the body cells become exceedingly acid large doses of alkali are indicated. We found that the vomiting subsided after the administration of potassium citrate and that it could be given in larger doses than the salicylates.

DR. HENRY DWIGHT CHAPIN read a paper on

ACIDOSIS.

This paper is based on observations made in thirty-four cases. The laboratory work was done by Dr. Marshall C. Pease. During the year 1913 we had our attention called to certain class of intestinal cases called cases of acidosis. It was found that these cases were very frequently fatal. Many of these cases did not show diacetic acid in the urine, and the illness was out of all proportion to the symptoms. The children became cyanotic and often stupor and coma supervened. The tongue was coated and red along the edge; the temperature was not high though the antemortem temperature might rise to 104 or more. Vomiting was often one of the initial symptoms but this ceased as the stupor and coma came on. The output of urine might be scant. The most consistent symptom in these cases was the alteration in the character of the respiration. The amplitude of the respiratory excursion was greatly increased and was accomplished with great effort. Czerny first called attention to this condition and found that there was an abnormal amount of acid in the body; that the total nitrogen was greatly increased, that this was not due to the abnormal accumulation of acids but to the loss of alkali and that this form of intoxication was more likely to occur in a condition of inanition or malnutrition. Acidosis may be due to damage to the epithelium of intestinal tract making it easier for the split proteins to pass into the blood. It may be due in a lesser degree to the withdrawal of water. Howland and Marriott have pointed out that there is often a decreased output of urine and an enormous loss of water with the feces. The necessity of determining the presence or absence of acidosis at the earliest possible moment is evident. Various methods of determining the presence or absence of acidosis have been devised, as Sellard's method for estimating the carbon dioxide content of the blood the more recent method of Van Slyke of determining the plasma bicarbonate or Howland's method of determining the carbon dioxide tension of the alveolar air. By means of these methods it has been found that acidosis is of more frequent occurrence than was formerly supposed. There have been in the Babies' Ward of the Post-Graduate Hospital thirty-four cases of acidosis and of these six died within a few hours of admission. In all, sixteen cases died, giving a mortality of 45 per cent. Twenty-six cases did not show acetone or diacetic acid in the urine but they showed a lowered carbon dioxide tension. The lowest carbon dioxide tension shown was 22 and the average was 28. After the administration of sodium bicarbonate in a number of cases the carbon dioxide tension rose, but with the reappearance of symptoms it fell again. The effect of the acidosis in some cases seemed to be permanent and

children who have had one attack frequently have recurrences. There was only one case of acidosis in a breast-fed baby; these children were fed on modified whole milk, sometimes with an excessively high percentage of protein. I have not met with a case of acidosis in a child fed on a carbohydrate diet. The acidosis seems to be due to the action of split proteins. Vaughan has given us confirmatory evidence that high protein feeding is not without its dangers, and says that in certain conditions it may threaten life itself. The decomposition of protein is a factor in the production of acidosis is supported by finding large amounts of indican in the urine. The administration of sodium bicarbonate formed an important part of the treatment of these cases after there has been a thorough cleaning out of the bowels; the bicarbonate has been administered in various ways, by mouth, per rectum, hypodermically and intravenously. An analysis of the diet in twenty cases of acidosis before and during treatment was made. The diets used in treatment were (1) sugar free; (2) fat free; (3) sugar and fat free; (4) a low vegetable protein and starch diet, and (5) starvation. The results of these observations seemed to justify the conclusion that there is a relationship between the protein of cow's milk and this type of acidosis.

DR. JOHN HOWLAND and DR. W. MCKIM MARRIOTT, Baltimore, presented a paper entitled

CONDITIONS IN INFANCY AND CHILDHOOD ASSOCIATED WITH THE PRODUCTION OF ABNORMAL QUANTITIES OF ACETONE BODIES.

The term acidosis is often used synonymously with acetonuria and acetonemia. Acidosis may or may not be present in acetonuria. Acetonuria is frequently present when acidosis is absent. A severe disturbance may be brought about by other substances than acetone bodies in the urine; again a considerable amount of acetone bodies may be present in the urine without producing a disturbance of any kind. Acetonemia of a moderate degree is quite common and acetonemia of a severe degree is not very unusual. It may occur with an intensity severe enough to threaten life without obvious cause. It may be recurrent. Hyperpnea is the chief clinical sign. It occurs only when there is a reduction of the alkali reserve; it is dependent on a loss of the acid base equilibrium of the blood. This condition can be determined by several relatively simple laboratory procedures. A diagnosis cannot be made by a qualitative analysis of the urine. Holt has found acetone present in 30 per cent. of 200 consecutive urines examined and in 70 per cent. of the cases suffering from lobar pneumonia, and it has been found in many other conditions as after anesthesia and after a period of starvation. In childhood acidosis resulting from the production of abnormal acids is found chiefly in diabetes and recurrent vomiting. A study of diabetes in childhood shows that enormous amounts of acid may be taken care of with no disturbance in the reaction of the blood, and with no effect upon the respiration. In recurrent vomiting the conditions are more obscure and less understood, but the evidence indicates that in recurrent vomiting the acidosis is due to the acetone bodies. In the

treatment of acidosis intravenous injections of sodium bicarbonate have been most effective. Older children react promptly and sometimes permanently to alkali therapy. In infants it may be possible to stop the clinical and laboratory evidences of acidosis, but they usually die. For this reason we should not wait until acidosis can be demonstrated, but in severe cases of diarrhea in infants we should give bicarbonate of soda in sufficient quantities to render the urine alkaline and to keep it so.

DR. S. BORDEN VEEDER and DR. MEREDITH JOHNSTON, St. Louis, presented a paper entitled

THE FACTOR OF STARVATION IN THE DEVELOPMENT OF ACETONURIA.

Until recently the terms acetonuria and acidosis have been used synonymously, but now the term acidosis is used in a more general way to designate a decrease in the alkaline reserve of the blood. In the present condition of our knowledge it is well known that we may have acetone bodies during starvation and in febrile and toxic diseases. The extent of the acidosis that may result cannot be assumed from the quantity of acetone bodies. The formation of acetone bodies is attributed to various causes, such as a deficiency of carbohydrates, a defect in carbohydrate metabolism, as a result of narcosis; they are found in many conditions in childhood. For this reason acetonuria is of interest to the pediatricist. Inanition may be a factor in the production of acidosis. It is of practical value to know how starvation affects the production of acetone bodies since starvation is a therapeutic measure frequently employed. We made observations on children of different ages and body weight, who were fed before the period of starvation on the standard diet containing 40 to 50 per cent. carbohydrate. It was found that the total quantity of acetone varied directly with the period of inanition. The total output of acetone bodies when the children were on this diet was about 3 milligrams per kilo body weight. During the first twenty-four hours of starvation there was little difference in the output of acetone bodies, but there was an increased elimination during the second day. If the starvation period extended only over one day the output on the second day returned to normal figures. In eighteen cases the starvation was continued during a second twenty-four hours and then there was a very marked increase of the acetone bodies on the second day, in one instance the increase was from 20 to 410 milligrams per kilo body weight and the increase of oxybutyric acid was from $1\frac{1}{2}$ to 5 grams. On the day following the two inanition days there was a continued acetonuria but it was less than on the preceding day. In febrile and toxic conditions the figures were high but not as high as in inanition. Folin and Denis have found that obesity is not a predisposing factor in increasing the output of acetone bodies. We made observations on children well nourished and on those undernourished and found no relation between the degree of acetonuria and the degree of inanition. All these children were closely watched for clinical symptoms, particularly with reference to the symptoms of acidosis in childhood.

There was not a single child that appeared to be affected in any way, save for hunger, by the lack of food, so that it seems safe to conclude that starvation cannot be the cause of the symptoms of acidosis.

DISCUSSION.

DR. JOHN LOVETT MORSE, Boston.—It struck me as Dr. Chapin described acidosis in infancy and spoke of the hyperpnea how closely it resembled the asthmatic dyspnea of our grandfathers. There are certain lessons to be drawn from these papers for the general practitioner, certain practical points that he may carry away with him. One of these is that the presence of acetone bodies in the urine is not proof of acidosis, and, *vice versa*, that the absence of acetone bodies is not proof that there is not an acidosis. If starvation causes the appearance of acetone bodies in the urine one cannot tell when he is giving the starvation treatment whether the acetone bodies are due to the starvation or to the disease. Acetone bodies may be found in all conditions in childhood accompanied by fever. What all this means is that the physician must learn to make an examination of the blood for acetonemia and not trust to the presence or absence of acetonuria. When he has learned to make these determinations he may learn from the examination of the blood whether the patient has acidosis and whether acetonemia is present, but even then he has not gone to the bottom of the matter for acetonemia is not a primary condition and if the patient is to be treated for this condition satisfactorily we must find the underlying cause of the acetonemia. According to newspaper statements, we had an epidemic of acidosis in Boston last winter, but in the vast majority of the cases the urine was never examined, and in many in which it was examined no acetone bodies were found. It would seem impossible to have an epidemic of acidosis because acidosis is a secondary and not a primary condition. It was my experience that if these children said to have acidosis were closely examined they were found to have something else the matter with them. As to the endemic form of acidosis, there is no endemic acidosis in Boston, but in certain parts of New Hampshire there are a great many cases of severe illness in children and the only symptoms found outside of vomiting are changes in the character of the respiration and a diminished output of urine with a very large amount of acetone bodies. The large majority of these children get well, but a certain number die. I do not think we can deny that these are cases of acidosis. In cases presenting these symptoms the complications have all shown bacterial infection of the blood and a local focus of infection.

DR. WILLIAMS.—Someone has spoke of the removal of water from the body as a factor in the production of acidosis. It seems to me that an inquiry as to the effect of the disturbance of the water balance might clear up this question. If this is an underlying cause an attack will be precipitated by diminishing the water. Any one who attempts to study acidosis by modern methods of pre-

cision will find that it is probably a rare condition. Nearly all the methods of estimating the carbon dioxide are very excellent but they are not within the means of the average physician, but there are some means of estimating the carbon dioxide tension that are exceedingly valuable and can be carried out at the bedside. Such a method supplemented by urinary analysis is very valuable, for, as a rule, when the body is producing excessive amounts of acid an excessive amount is eliminated in the urine. Also when the body produces an excessive amount of acid there is an increased ammonia excretion. The Folin method of estimating the acid in the urine and the ammonia is very simple and reliable and these two methods together are quite adequate in determining acidosis. I would also call attention to the fact that sugar will carry more than three times its weight in water and when we give sugar to the patient with acidosis we add to the water content of the body. Salts also have some influence in causing an increase in the amount of water in the body. Eating salt may cause the development of edema. I have never seen a patient die in acidosis if the body showed edema and this is confirmed by the experience that tests for diacetic acid are relatively unimportant.

DR. CATHCART.—We have been shown that inanition and the withdrawal of hydrocarbons caused an abnormal excretion of acetone bodies. In 1910, I called attention to the creatin-creatinin excretion in recurrent vomiting and also to the relation of acetone and acidosis in recurrent vomiting. It was shown that there was an increase of the creatin-creatinin just before the attack and an increase of the acetone bodies just before the attack as well as during the attack. I mention this because we must study acidosis in relation to other metabolic processes and we cannot afford to ignore such studies.

DR. CHARLES GILMORE KERLEY, New York.—This subject is one of the most important that will come before us at this meeting. I have been trying for the last five or six years to correlate these cases showing various types of recurrent symptomatology. We have cases that show a distinct acetonuria and cases of acidosis, but we also have border-line cases and it is these latter that give the most difficulty. These cases of acetonuria in scarlet fever, pneumonia, and measles may develop into straight cases of acidosis. Then we have instances in which both conditions occur in one patient. The type of cases showing the acetonuria are the children who have been getting too much milk. The majority of children of runabout age are overfed; they get too much sugar and too much fat and these are the cases that show acetonuria and high fever during an attack. Sixty to 70 per cent. of my cases of measles show acetonuria and a similar percentage of pneumonia and scarlet fever cases. While acidosis is said to be due in some instances to carbohydrate starvation the feeding of large amounts of sugar produces the same result because the powers of assimilation are temporarily held in abeyance. I have seen three cases of acidosis since last October. One was a breast-fed baby of nine months that was taken ill suddenly

and showed marked air hunger. There was no elevation in temperature. The child went into coma, had an acetone breath, and died within thirty-four hours. Another child two years of age died within forty-eight or seventy-two hours. Another case to which I wish particularly to call attention occurred after an operation. This child had an acute attack of appendicitis and shortly after operation developed an acidosis and lived twenty-four to thirty-six hours. Sodium bicarbonate was absolutely of no avail in these cases. It was injected into the arm repeatedly in this latter case. It might be a good scheme to fortify the patient before operation with sodium bicarbonate. I had two other cases which were border-line cases, in the one case there was an acidosis associated with pneumonia and in the other with pyelitis. The three cases first referred to were distinctly acidosis cases without complications.

DR. JOHN ZAHORSKY, St. Louis.—I would like to ask if there is any way the physician can make a diagnosis of acidosis without testing the blood so accurately. In how many cases of gastrointestinal intoxication can we depend upon hyperpnea and deep breathing as an indication of acidosis and is it better to give sodium bicarbonate to all these cases? Then again, in cyclic vomiting and acid intoxication after the use of chloroform can we prevent these conditions by administering sodium bicarbonate and glucose beforehand? In intestinal toxemia is it better to give barley water or saccharine water as is usual, or should one begin right away giving large doses of bicarbonate instead of calomel?

DR. C. S. WAHRER, Fort Madison, Ia.—Things are getting very complicated. I would like to ask a few questions though I do not wish to add to the confusion that Dr. Zahorsky has started. We have been told that acidosis occurs in some children and not in others under the same conditions. Does excessive sugar eating predispose to acidosis or will he be threatened with glycosuria? Is there a predisposition in some children to have acidosis or is there something in the etiology of acidosis that we do not recognize? Again what makes the predisposition? Is it that children during the first five years of life have a lessened resistance and consequently succumb more easily to acidosis?

DR. HENRY DWIGHT CHAPIN, New York.—The treatment of the diarrhea associated with acidosis is not different from the treatment of summer diarrhea. We have found that the best results are obtained by giving castor oil, washing out the bowel and then giving carbohydrates. These studies from the practical standpoint have not been altogether in vain.

DR. JOHN HOWLAND, Baltimore.—In the first place in the discussion the confusion has been made of calling recurrent vomiting acidosis. Cases of recurrent vomiting are not cases of acidosis. The overwhelming majority of cases of acetonuria are not cases of acidosis. Acidosis is not shown until there is a diminution of the alkaline reserve of the body, but in recurrent vomiting a diminished alkaline reserve is almost the exception. These children with recurrent vomiting have a metabolic disturbance which is

only a temporary disturbance in the great majority of instances. If there is a disturbance of the alkali reserve it does not adjust itself so readily. The alkali treatment is indicated when the acetoneuria is severe and prolonged. There is only one symptom of acidosis and that is hyperpnea, exaggerated breathing of the air hunger type. Acidosis may occur without fever and without vomiting; the only regular clinical symptom is the hyperpnea. The examination of the carbon dioxide tension of the alveolar air is not so difficult; it can be easily and quickly collected by the method that Marriott has devised. All of the tests that have been devised tell us a great deal more than we can find out by clinical methods alone. Almost all children who have diarrhea and hyperpnea have acidosis. We cannot tell when a child with these symptoms will develop acidosis so the safe thing to do is to give sodium bicarbonate until the urine is alkaline and to keep it so. Acidosis in children having diarrhea of the watery type is not due to the acetone bodies, but there may be other organic acids. In some cases there is an increase of acid phosphates and it may be that the anuria results in the production of these acid phosphates and they tend to produce acidosis.

DR. C. J. PETTIBONE and DR. F. W. SCHLUTZ, Minneapolis, presented a paper on

A FURTHER STUDY OF THE AMINO ACID CONTENT OF THE BLOOD.

This study was undertaken in order to show the variation of the amino acid content of infant's blood, particularly in relation to various forms of feeding and the time of feeding. A review of the literature shows that the amount of amino acids in the blood varies widely but there is little to show what relation the amount of amino acid in the blood bears to various pathological conditions. Normally the amount of amino acids in the blood of infants is 4 mg. per 100 c.c. of blood. In order to see whether there is any variation from normal the blood of sixty children, ranging in age from one month to thirteen years, was examined. Among the pathological conditions present in this series of cases were diphtheria, scarlet fever, bronchopneumonia, tuberculosis, atrophy, nervous disorders, nephritis, rachitis, alimentary disorders, encephalitis, tonsillitis. The blood was taken from the median basilic vein and examined by the methods of Van Slyke and Meyer, 2 to 5 c.c. of blood being used. The analysis was begun one-half hour after taking the blood. The figures obtained run lower than those of Van Slyke and Meyer for adults. In these diseased conditions there seemed to be no difference from the average found in health. The amount was not increased in febrile conditions. This was not what one would have expected. There was no striking correlation between the amount of amino acids in the blood and the length of time since the last feeding, although the amount was always lower than in adults.

SYMPOSIUM ON SYPHILIS.

DR. FRANK S. CHURCHILL and DR. R. S. AUSTIN, Chicago, presented a paper on

THE FREQUENCY OF HEREDITARY SYPHILIS.

Dr. Churchill said this study was based on a laboratory and clinical investigation of about 695 cases at the Children's Memorial Hospital from November 1, 1915 to June 1, 1916. A series of 102 cases reported on in 1910 by Dr. Churchill had shown thirty-nine positive Wassermann reactions. At that time he had called a number of weakly positive reactions positive which in the light of our present knowledge would not be considered positive, since it has been learned that a weakly positive Wassermann reaction might be obtained in many conditions other than syphilis, as yaws, leprosy, tuberculosis, eczema and some acute infections. There are two factors requisite in order that statistics may be considered reliable; they must be based on the examination of a large number of individuals and there must be accuracy of diagnosis. To meet this latter requirement both the clinical and the laboratory findings must be taken into consideration. Owing to the transitory positive Wassermann reactions in other conditions it is well to have the test repeated. Forty-two cases of eczema have shown positive Wassermann reactions, sometimes a single positive reaction and sometimes a double reaction. We have divided our positive reactions into three groups according to the degree of hemolysis that occurred, single, double and triple. A single positive reaction was regarded as of almost no value from the diagnostic point of view. A double Wassermann with physical signs of syphilis was considered good evidence of the presence of the syphilis. In the absence of physical signs it was well to have the test repeated. A triple Wassermann reaction even without physical signs of syphilis was fairly good proof of the presence of lues. In this series of cases we found twenty-three that could be considered as syphilitic. Sixteen of these twenty-three gave a triple Wassermann reaction. Six cases showed no physical manifestations of the disease and the diagnosis was based on the triple Wassermann reaction alone. In 640 of this series there was nothing suggestive of syphilis. This left a number of cases in which the presence of syphilis was doubtful. These were of no use statistically but should be kept under observation and given antisyphilitic treatment for their own benefit and for the good of society. A study of the literature with reference to the incidence of hereditary syphilis shows a wide range of results, the incidence in Europe and in this country varying from 2 to 14 per cent. In this series the incidence was 3.3 per cent., while in four of the largest studies made in this country it has varied from 2 to 6 per cent.

DR. ABNER POST, Boston, presented a paper on

THE CLINICAL COURSE AND PHYSICAL SIGNS IN HEREDITARY SYPHILIS, which was read by Dr. Philip N. Sylvester, of Newton Center, Mass.

There are irreconcilable variations in the descriptions of hereditary syphilis in the literature. This paper contains few additions to our knowledge and few theories. A difference should be recognized between the child who is syphilitic *ab initio* and one rendered syphilitic after life has begun. Hereditary syphilis has been confused with congenital syphilis. Hereditary syphilis occurs in a great variety of clinical forms and there is a difference between early and late hereditary syphilis. In the early type the children suffer from malnutrition, show emaciation, and a bullous eruption. The lips may be cracked and ulcerated, the digestion impaired, the liver and spleen enlarged, and there is a progressive emaciation. When a child suffers from this severe type of the disease death usually follows. There are all gradations of severity from this type just described to a type so mild that the child is apparently healthy, until something happens that gives an indication of the disease. In some instances obstinate wakefulness may be the only symptom to excite suspicion, and in these cases one is likely to find the bones affected. Nasal catarrh is present in a very large proportion of syphilitic infants and may lead to the impression that adenoids are present. In such children operation of course gives no relief. Indeed, in these children the nasal passage is definitely narrowed, and operation not only does the patient no good but exposes the operator to the risk of syphilitic infection. These syphilitic babies with snuffles have a peculiar cry which is quite characteristic to one familiar with it. Marasmus is often due to syphilis and in some infants there is little other evidence of the syphilis. In case of death the cause is given as marasmus but unquestionable in many of these children syphilis is the true cause. Syphilis shows a marked tendency to involve the lymphatic system. Frequently the peribronchial glands or the glands of the neck are enlarged and are mistaken for tuberculous glands. In many subjects the skin has a pale, sallow, yellowish hue. The eruption of hereditary syphilis is maculopapular, usually appearing first on the heels, then on the soles of the feet and palms of the hands. It presents a peculiar glistening appearance and in some instances there is desquamation. Other signs that are characteristic of early syphilis are shedding of the nails and thinning of the hair. Cranial exostoses may be regarded as incontestable proof of syphilis. It is most frequently observed at the two frontal and the two parietal sutures. This condition is sometimes attributed to rachitis, but it occurs long before rachitis would appear. The bone changes of syphilis may be mistaken for rachitis, tuberculosis, and osteochondritis. Periostitis may also be present, and the line of demarcation between epiphysis and diaphysis may be very indefinite. Treating the mother with salvarsan brings about a great improvement in the succeeding baby, but still there may be some stigmata of syphilis. It has often been stated that in the case of twins one may be healthy and the other may have stigmata of syphilis. We now have two pairs of twins coming to the dispensary. In these cases a thorough investigation revealed the stigmata of syphilis on the apparently healthy children. A careful Röntgenological study promises to be of great aid in the diagnosis of hereditary syphilis in the future.

DR. L. R. DeBuys and DR. J. A. LANFORD presented a

COMPARATIVE STUDY OF THE LUETIN AND WASSERMANN REACTIONS.

In reviewing the literature of congenital syphilis we find that there are not very many classical symptoms. Moreover, it is necessary to recognize syphilis early if we are to give the child the best possible chance in life. For this reason laboratory tests that can be depended upon are important. In making the Wassermann tests we have used practically the classical method of Wassermann; in making the luetin tests we used the technic of Noguchi, carried out minutely. We made, in all, 350 Wassermann tests and 159 luetin tests in 175 cases. Thirty odd cases studied several years ago are included in this series. The period during which the subjects were observed varied from one month to five and one-half years. There were seventy-nine children, sixty-three mothers, and eight fathers observed. In sixty-two families more than one member was tested by both the Wassermann and the luetin tests. The data was only partially complete in twenty-four cases and these had been excluded from the series, leaving 151 cases. The children varied in age from twelve days to just under puberty. The shortest luetin reaction in a mother occurred on the second day and disappeared on the third day; the longest reaction in a mother occurred on the twenty-fourth day; in another mother it occurred after fourteen days. In several instances positive luetin tests were obtained in those in whom it had been negative before. In some instances in which the Wassermann test was negative, a luetin test was made and was positive and a later Wassermann test also proved to be positive. It seemed that in some instances active antisiphilitic treatment brought about a positive reaction where previously it had been negative. The most violent luetin reactions occurred in a mother and a nursing baby in whom there were no signs of syphilis. It was discovered that the mother had been given potassium iodide; the interesting feature in this case was not only the effect of the iodide on the mother but its effect on the nursing baby. We have found that the luetin test is more reliable than the Wassermann. In eighty-one children and parents the readings of the luetin test are dependable. In three families there was a negative luetin and a positive Wassermann. We are inclined to think that this was due to an error in technic as they all occurred on the same day, and especially since these cases were not considered clinically as luetic. A positive luetin reaction was found in many instances in which the Wassermann was negative. It was found that a positive luetin ran regularly in families, and this fact was considered as further evidence of its accuracy. It was observed that the Wassermann reaction varied from time to time according to the activity of the disease. This was not the case with the luetin reaction. The luetin test, however, should not replace the Wassermann, for the Wassermann reaction indicates the presence of antibodies in the blood. The luetin test shows the presence of syphilis even in the latent stage. On the other hand, the luetin test has the disadvantage that it is influenced by cer-

tain drugs. In making the test it should not be considered negative until sufficient time has passed to be sure that one will not have a late reaction.

DR. P. C. JEANS, St. Louis, read a paper on

LATE HEREDITARY SYPHILIS.

The division of hereditary syphilis into early and late stages is not very satisfactory since the early changes may take place as late as the fifth or sixth years and the late changes may be present at the time of birth. This division into early and late changes must be relegated to its proper place. The only evidence of syphilis may be a positive Wassermann. There is very little literature in latent syphilis and the question arises whether latent syphilis should be treated. I think there is some advantage in carrying out treatment just as though some manifestations of the disease are present. Some express the fear that the treatment of such cases of latent syphilis may result in the development of a keratitis but if this should happen the probability is that it would have developed later without treatment. Head's classification is the one I have adopted in discussing syphilis of the central nervous system. Certain authors have tried to correlate syphilis and chorea. I have found one case in which syphilis was the cause of choreic symptoms. That syphilis was the cause of these symptoms seems evident since the case cleared up under salvarsan.

About 20 per cent. of the cases of epilepsy may be considered as due to syphilis. Multiple sclerosis proper does not occur in childhood. Hemiplegia is the most frequent acquired paralysis due to syphilis. Syphilis of the central nervous system is not as uncommon as has been supposed. Optic atrophy has been seen in children as early as the fourth year; tabes is not so rare but it is difficult to diagnose this condition in children. Paresis is more common than tabes. As the intelligence is not developed in young children it is more difficult to diagnose these conditions in children than in adults. It is often difficult to differentiate syphilis from tuberculosis, especially when the bones, joints, and lymph glands are involved. I have found that both the gross and the microscopical picture may be indistinguishable. I have found that Hutchinson's triad is scarcely ever present. In a study of several hundred cases we did not find it once. I have found keratitis present in 25 per cent. of my cases, Hutchinson's teeth in 6 per cent. and deafness in 1 per cent.

DR. PHILIP H. SYLVESTER, Newton Center, Mass., read a paper on

THE TREATMENT OF HEREDITARY SYPHILIS.

A pregnant syphilitic woman has a much better chance of having a viable child if treated than if untreated. Since the establishment of our system of prenatal care in Boston I feel sure that the percentage of viable children is greater and there are fewer abortions than before. Salvarsan is effective in the early cases but it has been largely discarded in the treatment of the new-born in favor of neo-

salvarsan. We have found that after treatment with salvarsan or neosalvarsan alone the clinical symptoms are likely to return so that we have returned to the old treatment by mercury. There has also been a reaction in favor of mercurial inunctions. The tendency is to increase the dose of salvarsan rather than to diminish it and to give it in a concentrated solution. It can easily be given through the longitudinal sinus. Some new ideas have been advanced in regard to the treatment of syphilis with antimony and mercury by inhalation, but thus far nothing very definite can be said of them. There is very little to show that the treatment of the mother after the birth of the child had much influence on the child. It has been thought that the breast milk contained antibodies when the mother was under treatment and again the improved condition of the child has been attributed to the better milk supply because the mother's health was improved by the antisyphilitic treatment. In treating a case of hereditary syphilis mercury should be given for several months; it may be omitted for a time and then begun again. If at the end of six months the Wassermann is still positive the treatment should be continued at intervals. In fact the treatment should be continued at intervals for two years whether the Wassermann is negative or not. If at the end of two and one-half years the Wassermann is negative the child may be considered cured. Some give neosalvarsan every three or four months in addition to the mercuric treatment. The late cases of syphilis in children may be divided into two groups, one corresponding to the tertiary stage in the adult, and the other including cases of syphilis of the nervous system; in the former the results of treatment are more encouraging than in the adult, but less so than in the earlier stage of the disease, while the treatment of syphilis of the nervous system is not so encouraging some promising results have been obtained by the Swift-Ellis treatment. The development of the Wassermann reaction has shown that many cases of malnutrition and retarded mental development are due to syphilis. Many of these children are not sick but they are distinctly under par, and if the Wassermann reaction is positive they should be given antisyphilitic treatment. Of fifty cases treated by the writer, eighteen presented clinical evidence of early syphilis. For a baby one month old we use 0.1 of a grain of salvarsan; from one to six months 0.2 of a grain, and from six months to one year 0.25 grain. The treatment given in different cases in this series emphasizes the importance of early treatment and of continued treatment over a period of two years. Though treatment of syphilis of the nervous system has been disappointing it is not discouraging and all cases should be treated.

DISCUSSION.

DR. BORDEN S. VEEDER, St. Louis.—I wish to emphasize one point with reference to the involvement of the central nervous system in hereditary syphilis. The statements made in the text-books regarding the involvement of the central nervous system in children are probably incorrect; this is probably because so many cases do

not present symptoms that are recognized as hereditary syphilis. The statement was made that it is easy to give salvarsan intravenously. I have not found it easy in all instances. I have used intramuscular injections of bichloride of mercury and have found that the cases clear up more rapidly with this treatment. I give a 1 per cent. solution in 4 or 5 minims. This method of treatment has one drawback and that is that one must watch the kidneys very carefully to avoid activating a nephritis by the bichloride. In syphilis of the nervous system I give mercury as salvarsan does not seem to have the slightest effect in these cases. This is probably due to the fact that in syphilis of the nervous system the lesion is due to the death of nerve cells and nothing will do any good.

DR. HENRY DWIGHT CHAPIN, New York.—If I recall correctly Dr. Sylvester spoke of giving large doses of mercury in little children. It should be remembered that in young children gingivitis is not present to serve as a warning that a sufficiently large amount of mercury has been administered. Gastrointestinal symptoms have been spoken of as a manifestation of syphilis and I would like to add another symptom and that is prolonged anemia. This is difficult to treat in some cases. There is an impression that breast milk may be affected by administering the arsenical preparations to the mother. I attempted to prove this statement, but have never been able to find arsenic in the breast milk and have abandoned the idea of influencing syphilis in the child by treating the mother. Osteochondritis may be distinguished from rickets because it is unilateral, while in rickets the swelling is invariably symmetrical.

DR. JOHN LOVETT MORSE, Boston.—Enlargement of the lymph nodes has been spoken of as a sign of syphilis. Enlargement of the lymph nodes is very common in disturbances of nutrition so I think it may be disregarded as a sign of syphilis. As to chorea, we recently made a study of chorea and found that there is practically no evidence to show that syphilis is directly the cause of chorea. In a series of thirty cases of chorea we found only one case in which there was a positive Wassermann reaction and that was feeble. As to the case of chorea which Dr. Jeans believed was due to syphilis because it was benefited by salvarsan, it may be recalled that some French observers have been treating chorea with arsenical preparations intravenously and think that they have obtained very favorable results, so that the fact that the case was favorably influenced by salvarsan is not proof that it was caused by syphilis.

DR. MARY DUNNING ROSE, New York.—In two instances we have been very much misled by the Wassermann test. In one case the Wassermann was found to be negative by a thoroughly competent man and the report came back that the lesion was simply an ulcer. Six months later the child returned with the ulcer very much worse. The luetin reaction was then done and was positive. If the Wassermann test had not been made in this case we would have treated it very differently; as it was six months of valuable time was lost.

DR. H. M. McCLANAHAN, Omaha, read a paper entitled

A CASE OF DUODENAL ULCER—OPERATION AND IMPROVEMENT.

This patient was seven years of age when first seen by the writer; she had been well until she was five years old. She then began to have attacks of gastric pain and vomiting at intervals of from three to six months. There was a peristaltic wave that could be induced by drawing the fingers across the abdomen, tenderness, and a palpable tumor. The case was diagnosed as either partial stenosis of the pylorus or malignancy. Dr. Jones of Omaha operated on the patient and found the stomach much dilated and a very small pyloric orifice with a ring that could not be stretched. The operation performed was a gastrojejunostomy after which a prompt recovery took place. The child was soon apparently well but was not sufficiently careful of her diet and after a time the symptoms reappeared. This relapse shows the need of careful postoperative treatment. At the operation Dr. Jones found what was evidently a healed duodenal ulcer.

DR. E. E. GRAHAM, Philadelphia.—Pyloric stenosis in older children is not so uncommon as has been supposed. Some years ago I began to be on the lookout for pyloric stenosis in children and this condition is not so uncommon, but duodenal ulcer is quite uncommon. The symptoms of peristaltic wave and typical tumor do not occur as a rule in older children and in this particular Dr. McClanahan's case is very interesting.

DR. CHARLES GILMORE KERLEY, New York.—This case is rather unusual. The peristaltic wave is a very frequent symptom in little children, but it is comparatively rare in older children. The palpable mass is also a factor in making a diagnosis. In some instances very young babies have a hypertrophic stenosis and it is very difficult to determine its presence by palpation. Just before coming here I had a case which was operated on by Dr. Downes for hypertrophic stenosis of the pylorus and a mass was found an inch long and more than an inch in diameter and neither Dr. Downes nor I had been able to feel the mass. The fact that one does not find the tumor does not mean that there is no hypertrophy and partial stenosis and because of this fact the condition is often overlooked.

DR. M. L. TURNER, Des Moines, Ia.—I had a case of pyloric stenosis lasting six weeks in which plastic operation was performed, a longitudinal section of the tumor. The child was only three months old and made a good recovery.

DR. JULIUS H. HESS, Chicago.—I am familiar with Dr. Strauss's work. In a series of twenty-three cases, twenty-one of which are still living, a posterior gastroenterostomy was done and a fluoroscopic examination of these cases shows that in nineteen the bismuth passes through the gastroenterostomy opening and not through the pylorus. In twelve operations done by the method Dr. Strauss is doing to-day all the patients are living and well. The operation itself is fairly simple and has certain advantages over the Ramstedt operation. A flap of muscle fills in the space that is left open in the Ramstedt

operation and there is no open surface left. The greatest advantage of this operation is that the food takes a natural course through the digestive tract and the patient gets the pancreatic juice and the bile in a normal way as he does not when the food takes a shorter course to the duodenum. As to our mortality by this operation, we had one death in ten cases.

DR. CHARLES GILMORE KERLEY, New York, read a paper on

CHRONIC DIGESTIVE DISORDERS OF MECHANICAL ORIGIN IN CHILDREN.

Digestive disturbances may be grouped into three classes: those due to bacterial infection, those due to perverted function, and those dependent upon chronic appendicitis. There is a certain class of cases showing recurrent symptoms of gastrointestinal disturbance, such as vomiting, fever, and sometimes respiratory symptoms, that does not respond to the treatment that is usually effective in this class of patients. In seeking for the reason of my failure to get results in these patients, I finally resorted to the *x*-ray and this has opened up an entirely new field. Many of these cases had shown intractable constipation or constipation alternating with diarrhea; the explanation of this has been furnished by the *x*-ray. In some instances we found an elongated colon and in others ptosis of the stomach, while in others, again, a partial pyloric stenosis was found. I have found massage and physical therapy of the greatest aid in dealing with these cases of elongated sigmoid. In addition to the massage and physical therapy, Russian oil, olive oil, and fluid extract of cascara have been employed in combatting the constipation. If I wish to give a teaspoonful of cascara a day I give it in three doses and in that way get a better effect than if the whole dose was administered at one time. The diet is regulated by omitting white bread, rolls, crackers, and similar articles of diet and giving more vegetables and fruits, except in cases in which there is diarrhea. In these latter cases I omit the fruit and vegetables and give boiled skimmed milk. These röntgenograms indicate the possible dangers of enemata in children. The result is to further irritate the bowel. The *x*-ray examination in children suffering from such chronic conditions has the additional advantage that it serves to show the parents just what is causing the trouble and thus makes it easier to get their coöperation. When the parents are shown that the child has an anatomical deformity they do not expect the child to be cured immediately and are thus more willing to give their coöperation during a course of treatment. In many of the cases examined we found that we were dealing with a ptosis. As is well known most of the ptoses of adult life are either congenital or acquired during childhood. The child of five, six, or eight years of age, eats a large meal three times a day and with each meal drinks two or three glasses of milk, being urged to do so by his parents. The consequence is that the stomach is loaded far beyond its carrying power and a ptosis results. These patients suffering from ptosis of the stomach are benefited by wearing an Aaron bandage modified for children and having a transverse ridge which supports the

stomach. It is my custom to have these children rest on the right side after meals. By this method of treatment, the vomiting, the asthmatic attacks, the eczema, the colitis, or the constipation, have disappeared or been greatly helped. We feel that the recognition of the true condition in these patients is a great step in advance.

DR. LEON T. LEWALD, New York, gave a lantern-slide demonstration of

RÖNTGEN-RAY FINDINGS OF CHRONIC INTESTINAL AND STOMACH DISORDERS OF MECHANICAL ORIGIN IN CHILDREN.

This series of pictures shows the conditions found in the class of patients considered in Dr. Kerley's paper. The first series of pictures show the natural position of the stomach in infancy and the air normally present. It shows that when the baby is fed and then kept in the horizontal position the food in the stomach closes the esophageal opening so that air cannot escape and as a consequence it is forced into the intestines and causes colic. This trouble may be avoided by throwing the baby over one's shoulder in an upright position as this posture gives the air an opportunity to escape. These pictures show the elongated sigmoid the ptosed stomach or the partial pyloric stenosis to which Dr. Kerley has referred. It is my rule to consider a case suitable for operation if no food is seen passing through the pylorus one hour after a meal. I would like to warn surgeons in doing a gastroenterostomy to always be very sure that they have closed the pyloric end of the stomach; I have seen several cases in which a fatal pneumonia has resulted from failure in this respect. The fact should be emphasized that ptosis is not a matter of anatomy but of function. I would like to show these two instances of syphilis of the stomach. It is becoming increasingly evident that many visceral lesions are of syphilitic origin, not only gumma, but interstitial changes. As time progresses these will be more frequently recognized. The operations that have been suggested as corrective of the elongated sigmoid are an anastomosis between the cecum and the sigmoid or a resection of the proximal portion of the sigmoid.

DISCUSSION

DR. HENRY DWIGHT CHAPIN, New York.—I presented a paper on this subject at the Minneapolis meeting several years ago and showed a series of x-ray pictures to demonstrate that the sigmoid flexure in infants is a very much larger structure than has been supposed. This study was limited to infants. In this series of cases there were several in which the sigmoid went above the umbilicus, and in other instances it made a figure eight and was very mobile and very large. It was shown that the sigmoid flexure was much larger and more complicated than had been recognized and it demonstrated the utter uselessness of trying to give high enemas to babies. One cannot pass a soft catheter into the sigmoid flexure of a baby, and I hope we are coming to the point where we will stop annoying babies by trying to pass a tube. If one passes the tube only 2 or 3

inches into the rectum and places a bag 2 feet above the baby and allows the fluid to flow slowly the entire large intestine can be filled by the solution.

DR. L. R. DEBUYS, New Orleans.—I have been very much interested in the pictures shown by these men, particularly the first group of patients showing the shadows of the air ball at the top of the stomach when the child is erect. At the same meeting at which Dr. Chapin read his paper I had one in connection with which I showed obstructions and pylorospasm. One of these cases was a case of syphilis of the stomach and the peristaltic wave was shown. This case cleared up under treatment. What we have been shown with reference to the air ball leads me to believe that projectile vomiting may be due to the air ball. It seems possible that the air becomes so compressed that it finally forces its way through in the path of the least resistance and forces out what lies in its way.

DR. HARRY LOWENBERG, Philadelphia.—The presence of a peristaltic wave and a palpable pylorus are not always indications for operation. With the charcoal test and the x-ray it can be shown whether the child is getting sufficient food to sustain life and by watching the weight chart one can keep careful watch on the child's condition. In this way one can speedily come to a decision as to whether he is dealing with an operative or a nonoperative case. I would like to ask Dr. Kerley whether he has had any of these cases which he has described operated upon.

DR. JOHN ZAHORSKY, St. Louis.—I had a child five years of age who gave a history of vomiting for over two months. Two or three doctors had treated the child for dyspepsia. One could not make out much so it was suggested that we have an x-ray picture taken. This picture apparently showed an obstruction at the iliocecal orifice; nothing seemed to pass through for hours and hours. We planned to have an exploratory operation, but when the child arrived he gave a history of slight spasm during the previous night and we made out a beginning cerebral tumor.

DR. KERLEY, closing the discussion.—The question has been asked as to further details of management in these cases. The massage was given two or three times daily. Sweet oil or olive oil was given in $\frac{1}{2}$ -ounce doses. These children were helped by being taken off of cow's milk mixtures and put on evaporated milk mixtures. I had one case which was operated upon. That was a case in a class by itself, a freak case, and for that reason I did not report it.

DR. JULIUS H. HESS, Chicago, presented a paper on

FAMILIAL CYANOSIS.

For want of a better name this term is used to designate a clinical picture occurring in three brothers, aged eleven, nine and five years of age respectively. The cyanosis of the skin and mucous membranes in these children is constant, increasing on exertion, excitement, and more especially in the presence of inflammatory conditions of the respiratory tract to which all three boys are subject. Very careful physical examination, röntgenographic and metabolic studies, blood

and tuberculin tests were carried out in each of these children. The spectroscopic examination in each instance showed that the absorption bands corresponded to oxyhemoglobin. The skin showed no pathological pigmentation. The spleen and liver were seemingly normal in size. The physical examination did not yield signs of heart involvement sufficient to account for the condition presented. In endeavoring to account for this condition we found that a comparison of the venous and arterial blood in cyanosis and in normal conditions could be made by measuring the carbon dioxide tension and that this was of direct help in diagnosing congenital heart lesions.

DR. EDWIN E. GRAHAM, Philadelphia, read a paper entitled

A STUDY OF THE DEATHS IN PHILADELPHIA DURING THE PAST FIVE YEARS FROM SCARLET FEVER, MEASLES, DIPHTHERIA, WHOOPING-COUGH AND TYPHOID FEVER.

The most effective way of showing the facts which these statistics bring out is by grouping the mortality rates of the different diseases according to ages at which the disease occurred. In studying the death rate in infants under one year of age it was found that pertussis was responsible for the greatest number of deaths, more than measles, diphtheria or scarlet fever. Measles had the next highest mortality, the number of deaths caused by measles much exceeding that caused by diphtheria. With the exception of typhoid fever, which was rare during the first year of life, scarlet fever caused the fewest deaths. In the entire series for all ages scarlet fever caused fewer deaths than any of the other diseases considered. The largest number of deaths from measles occurred between the first and second years of life. Pertussis was not so fatal after the first year of life, though the death rate from this cause was high during the second year. Between the ages of two and five years, diphtheria caused far more deaths than all the acute infections combined. Scarlet fever showed the lowest mortality at this age of any of the diseases under consideration, though it caused more deaths in children between the ages of two and five years than at any other age period. At this age measles was a serious disease. Whooping-cough caused almost as many deaths between the ages of two and five years as in those under two years of age; therefore, it must be considered a serious disease during the early years of life. The mortality of typhoid fever increased year by year and did not reach its highest point until adult life. In the age period from five to ten years, diphtheria caused more deaths than any other disease. At this age the mortality from measles and whooping-cough decreased rapidly. There was no mortality from whooping-cough between the ages of five and ten years. On the other hand, at this age period typhoid fever caused more deaths than any other acute infection, and diphtheria ranked second. Between the ages of fifteen and twenty years there was an appreciable increase in the number of deaths from typhoid fever, while the mortality from scarlet fever was very low. From 1911 to 1915, the number of deaths from scarlet fever was 608 and of these 45 per cent. occurred between

the ages of two and five years. Taking the death rates for all ages diphtheria was the most fatal disease in this group, having caused during this five-year period in the city of Philadelphia 1741 deaths. Typhoid fever had the next highest mortality. During the past two years the mortality from typhoid fever had dropped perceptibly; this was probably due to the new and improved water supply and to the more general pasteurization of milk. The combined mortality from diphtheria was 11.8 per cent. This high mortality was attributed to the late recognition of this disease, for which parents were more often responsible than physicians. A study of the incidence of scarlet fever in relation to the severity of the disease showed that the mortality was lower when the number of cases was fewer. The points to be particularly emphasized in this study are the low death rates from scarlet-fever, a disease for which most people have a great dread, and the high death rate from measles and whooping-cough which have not been considered by the laity as serious diseases and against which children are less carefully protected than they are against scarlet fever.

DISCUSSION.

DR. ISAAC ABT, Chicago.—I wish to tell Dr. Graham how much I have enjoyed his painstaking paper. We may have cases of scarlet fever which do not show the anaphylactic skin reaction and which are unrecognized. We may have mild epidemics or severe epidemics; there may be very little scarlet fever, then suddenly there will be a severe epidemic and the mortality will be very high. I want to say just a word with reference to diphtheria. It is a sad commentary on our efficiency as physicians that in a disease in which we have a real specific the mortality should be higher than in those diseases in which we have no specific remedy. We do not recognize diphtheria sufficiently early. In the training of medical men we should insist that they learn to make a clinical diagnosis of diphtheria; they may make a mistake occasionally but the clinical diagnosis will frequently be correct. When the membrane is dense and covers the uvula and nares, one is justified in making a diagnosis of diphtheria. Physicians should be urged not to depend too much on the laboratory.

DR. McCLEAVE, San Francisco.—Dr. Abt is right. Clinical action should not wait on the laboratory.

DR. B. F. ROYER, Harrisburg, Pa.—There is no doubt but that waiting on the part of the physician to get a positive culture is responsible for many deaths for diphtheria and I would urge young medical men to base their diagnosis on clinical symptoms. It takes from twelve to twenty-four hours, sometimes thirty-four hours, to get a positive laboratory diagnosis and that time means life or death to the patient. I feel that it is better in a suspicious case to give the child antitoxin first and then wait the result of the laboratory examination. The mortality from diphtheria is increased by the large number of cults, the practitioners of which are not trained in physical diagnosis. Scarlet fever occurs in epidemic waves. We go

along with a mild type and a low death rate and then we get an epidemic with a high death rate. In 1910 we had an epidemic in a Slavish community in Pennsylvania in which the death rate was 18 per cent., while in Philadelphia it was only 2 per cent. In this epidemic the type of scarlet fever was very severe and in searching for the source of the epidemic it seemed probable that a family of immigrants from South Austria might have brought the disease with them. We should have more strict regulations with reference to the control of whooping-cough. We should not allow children from families in which there is a case of whooping-cough to attend school.

DR. MICHEL.—Although I am very much in favor of giving antitoxin and not waiting for the laboratory diagnosis, I would like to put in a plea for taking a culture and having it examined early. As soon as one sees a child with a sore throat the culture should be taken. Say we see a child in the morning, we can have the culture examined by evening, and then have both the clinical and the laboratory examination on which to base a diagnosis. One gets a positive cultural finding sometimes before he gets the clinical manifestations of the disease. Where there is a membrane one should not wait for the laboratory report.

DR. JESSIE M. MCGAVIN, Portland, Ore.—In Oregon it is twelve hours before we can get a report from the laboratory and I feel that by waiting to get the result of the laboratory examination before giving antitoxin we sign many more death certificates than when we administer antitoxin before getting the report. Then sometimes we get a negative report and later we find that we have a case of laryngeal diphtheria. In some cases in which we may not get very positive signs and yet decide to give antitoxin, and then watch the child, we will find that in two or three hours the respiration will have improved and the child will go to sleep. I have known of two or three instances in which a diagnosis of something else than diphtheria was made and the child died and it was found that laryngeal diphtheria was the cause of death. It has been my experience that we should give antitoxin if the clinical findings are suggestive of diphtheria regardless of what the laboratory says.

DR. CHARLES GILMORE KERLEY, New York.—I do not see just why Dr. Graham has included the statistics in the age period from fifteen to twenty years, since when individuals reach this age they are considered as adults. As regards scarlet fever, I have never seen a case of scarlet fever in a child under one year of age and I always question the accuracy of the diagnosis when anyone says such a young child has scarlet fever. Diphtheria is one of those diseases in which the child may not be objectively ill until it is in a dangerous condition. If all children with diphtheria had febrile symptoms and the physician was called early the mortality could be brought down to 3 per cent. One would of course give antitoxin on a guess in all these plain cases, but there will be some cases that have a sneaking onset. It seems to me the mortality from typhoid fever as given, 14 per cent. in people under twenty years of age, is too high.

DR. CLIFFORD G. GRULEE, Chicago, read a paper on

ALKALI-EARTH ALKALI EQUILIBRIUM IN SPASMOPHILIA.

We have made observations on six cases of spasmophilia at the Presbyterian Hospital in Chicago. We found that giving large doses of calcium salts, reduced the electrical irritability in spasmophilic children, while giving sodium and potassium salts increased the irritability. The increase in the electrical irritability was accompanied by a drop in weight. Three nonspasmophiliacs were given sodium and potassium salts and no effect was produced on the electrical irritability. It is quite likely that the reduction depends upon the length of time the salts are given. I do not feel that these observations have shown any definite relation between alkali earth equilibrium and spasmophilia, but the results speak for an increased electrical irritability and a retention of sodium and potassium salts. There was a distinct relation between the weight curve and the irritability curve. The dosage used was ten or fifteen grains of sodium bicarbonate or citrate every two hours. Calcium lactate was given in large doses every four hours.

DISCUSSION.

DR. ALBERT BEIFELD, Iowa City.—I am very much interested in this subject but have only one case to report. In one boy I tried the administration of calcium salts by the mouth and intravenously and found that it about controlled the case. The calcium salts produced practically a negative effect on the cathodal contraction. The calcium chloride was given in fifteen-grain doses every hour and there was a lessened electrical irritability within a few hours after its administration.

DR. HENRY F. HELMHOLZ, Chicago.—There was an interesting paper read in Washington in which it was shown that the calcium content of the blood during tetany was markedly reduced and this might explain some of the benefit that Dr. Grulee has observed in these patients during his experiments.

DR. JOHN ZAHORSKY, St. Louis.—Cases of spasmophilia have attacks one, two or three months before we can get rid of the clinical signs of the disease. It seems that there is a more profound disturbance of nutrition back of the condition than merely a disturbance of salt metabolism and it is a question whether we will solve the problem by studying simply this phase of the condition.

DR. T. C. McCLEAVE, San Francisco.—I would like to ask whether calcium lactate is as efficient as the other salts of calcium.

DR. GRULEE (closing the discussion).—Calcium lactate gave me good results. Much of this work must be reported with reservations. It is not what we give but what the child absorbs that is observed in the results. I feel that the calcium treatment of spasmophilia is a distinct advantage.

DR. ISAAC ABT, Chicago, read a paper entitled

A STUDY OF 226 CASES OF CHOREA.

Although we have a voluminous literature on chorea there are many phases still open for discussion, because we do not know the exact cause of the disease. A study of statistics will show that chorea is one of the most common of diseases. Our hospital records show that we have treated 226 cases since 1880. During this time we had 80,000 patients of whom 10,150 were children. The cases of chorea were, therefore, $2\frac{1}{5}$ per cent. of all cases treated. Some claim to have seen congenital chorea, but the usual age at which it occurs is from five to fifteen years. Our records show the highest percentage of cases between five and fourteen years. We have had two cases, however, that occurred at three and one-half years of age. The disease is more frequent among females than among males. Many authorities give the ratio as three females to one male. In our series we found two females to one male, that is, 151 girls and seventy-five boys. In studying the seasonal incidence of chorea we took the number of admissions to the hospital during the different months and found that January had the highest number of admissions and December next. October showed the fewest. The association of endocarditis and rheumatism with chorea was noted by early observers. The theory of the relation of rheumatism and chorea gained considerable credence many years ago. Bacteriology has not given any proof of the relation of rheumatism to chorea. However, it is my belief that chorea is of infectious origin. In 143 cases in this series in which an effort was made to get the history in reference to rheumatism, we found that only thirteen gave a definite history of articular rheumatism. In 119 cases there were no manifestations of rheumatism preceding the development of chorea. Our findings regarding the relation of chorea and tonsillitis were similar. These records do not justify the assumption that there is any relation between chorea and the acute infectious diseases. There has been a tendency to assume a relation between syphilis and chorea. Some French observers even claim that they have successfully treated cases of chorea with salvarsan or neosalvarsan. There were only two cases in this series that showed any definite manifestations of congenital lues; these were probably mere coincidences. While I consider chorea as of infectious nature, there is no question but that shock may bring on the symptoms of the disease. There seems to be a tendency to localization of choreiform movements. Of 153 cases observed in this respect, forty-six showed a greater degree of movement on one side than on the other. Of the 226 cases in this series seventy-three showed cardiac affections, the majority being diagnosed as mitral. A few cases showed various other complications. Some cases showed difficulty in speech and mental symptoms. The total death rate in this series was about 2 per cent. There was only one death that could be considered as the direct result of the chorea. The average cases remained in the hospital five to eight weeks. There were thirty-five cases that showed

recurrences. Some of the cases that were treated with arsenic recurred and some that were not treated with arsenic did not recur. It seemed on the whole that those cases treated without arsenic did as well as those that were treated with arsenical preparations. Arsenic may possibly have a deleterious effect on the heart muscle and innervation. It seems unfair to treat a case of chorea with salvarsan unless syphilis is present.

DISCUSSION.

DR. HENRY F. HELMHOLZ, Chicago.—At the Children's Memorial Hospital we had 138 cases of chorea and of these $33\frac{1}{3}$ per cent. gave a history of tonsillitis. Of the entire series 54 per cent. gave a history of either tonsillitis, rheumatism or cardiac involvement. From Rosenow's work which shows that the streptococcus has a tendency to localize in different parts of the body and it may be that the same organisms under slightly different circumstances may localize in the brain. A single positive finding of this kind would be of more value than a series of cases of negative findings which mean nothing.

DR. ABRAHAM JACOBI, New York.—I have seen a great deal of chorea and I wrote on the subject in 1875 in connection with its association with rheumatism in children. At that time I came to the conclusion that chorea, rheumatism and endocarditis were in close proximity and relationship. I came to the conclusion that this series of infections occurred very frequently in the order of rheumatism first, endocarditis second, and chorea third. They do not always occur in this order but the history shows that they are related. One thing we should then urge and that is that rheumatism should not be overlooked, because it is frequently overlooked in children that do not walk. Children that walk may sometimes show a limp that should suggest rheumatism as the cause. Rheumatism is also frequently overlooked because the pain being attributed to "growing pains." It seems to me that we have not made much progress so far as our knowledge of the etiology of rheumatism is concerned during these later years. I do not think that arsenic as a remedy is frequently deleterious. Arsenic in both adults and young children is a tissue builder and I use it especially in myocarditis, where we have a functional murmur, because just like the phosphates it builds up the tissues. I can recommend arsenic as the result of twenty or thirty or more years experience in a fairly well developed general practice. I regard arsenic as a help rather than a danger. I wish to tell you of something that is in the near future but which has not yet appeared in the literature in regard to the treatment of chorea. Dr. A. L. Goodman has been treating chorea in a way that effects a cure not after weeks or months but in a very few days. He has treated about twelve cases in which I have observed the results, and I am not easily led astray and can vouch for the effectiveness of his treatment. He withdraws blood from the patient, about 40 c.c., takes the serum which is about 18 or 20 c.c., and injects that into the spinal canal. The patients are cured in a

day or two. If the patient is not cured by the first injection, but simply relieved, a second injection is given.

DR. C. T. McCLEAVE.—I presume Dr. Goodman's treatment is based on the theory of immunity. Do you know on what he bases this treatment?

DR. JACOBI.—I do not know his theory and I am not sure that he had one. These patients with chorea came for months and years and it seemed we were not able to cure chorea so Dr. Goodman thought that as so much had been done with vaccines and sera he would try that. The bacterins are not as successful as some believe, but the sera are much more successful. Dr. Goodman was as much surprised as any one here at the results.

DR. ISAAC ABT.—We may summarize by stating that much may be said on both sides; chorea is in many instances an infectious disease but in many it indicates a condition of nervous excitation. Such children under proper treatment very readily recover and these cases are not the result of specific rheumatic infection. In some cases chorea is a symptom of nervous exhaustion. As to Dr. Goodman's treatment, we may get much from some such form of treatment. I have treated children and babies with chorea with and without arsenic and those without arsenic recovered as rapidly as those with arsenic. It seems to me that in the treatment of chorea, especially in neuropathic children, it is better if these children are away from their family, kept quiet, given hot baths, etc. Under such treatment they recover in a short time.

DR. EDGAR P. COPELAND, Washington, D. C., read a paper on

OBSCURF FEVER IN INFANCY AND CHILDHOOD.

In considering fever of obscure origin we must bear in mind the structural and functional immaturity of the heat regulating mechanism, in every sense comparable to the immaturity of other systems in early life. The effects of such deficiency invariably present to a greater or less extent in the very young, but always more pronounced in those individuals exhibiting other evidence of instability of the nervous system, as expressed in convulsive attacks, tetany, etc. Under such conditions the responses to varied stimuli manifest themselves as unusual disturbances of body temperature. The recognition of these facts does not obviate the necessity of the most diligent search for those definite pathological conditions giving rise to obscure fever in childhood. Among the conditions that may be responsible for obscure fever are dental caries, middle ear disease, and obscure disease of the tonsils. Occasionally even a competent aurist will fail to diagnose middle ear disease. In some cases drainage from the middle ear is into the pharynx and nothing of the condition can be learned by the ordinary aural examination. If in such an obscure case leucocytosis is high paracentesis should be done.

The tonsils may be the seat of infection when they have not been suspected and they are the cause of obscure fever oftener than is generally supposed. When any suspicion is attached to them they should be removed.

DR. F. M. POTTENGER, Los Angeles.—I have been paying a great deal of attention to the cases of obscure fever. It seems to me that the obscure fever which the reader of the paper refers to is in many cases dependent upon the syndrome of toxemia, the fever is simply a part of the sympathetic disturbance. The toxemia is produced by proteins broken up in the body. These proteins may be divided into poisonous and nonpoisonous. We have learned that if we give proteins to a fasting animal that animal develops a fever. The same thing is seen in typhoid fever when after the patient has been fasting milk is given. The patient gets protein poisoning and a rise in temperature. The depressive emotional states do the same thing as the toxemia. They act through the sympathetic system, causing a vasomotor constriction which may result in elevation of temperature.

DR. T. C. McCLEAVE.—I was interested in what Dr. Copeland said about the tonsils and the difficulty of getting throat men to remove tonsils and I think he is just right. When the pediatrician recommends the early removal of the tonsils the throat man should have nothing to say about it. As a rule, he is not familiar with general pathology in relation to conditions of the tonsils. The question of the removal of the tonsils should be decided by the pediatrician.

DR. JACOBI.—In very few cases is it the tonsil that is at fault, even very large tonsils are not at fault, but it is the rest of the pharynx, all the lymphoid bodies that surround the antrum, that are more often responsible for the fever and toxic symptoms than the tonsils themselves. That is why we should teach that the nose should be kept clean. The cleansing should not be done by means of an atomizer but by irrigation, by pouring in warm water and salt, but snuffing must be avoided as it is dangerous. If care is not taken to avoid snuffing there is danger of causing middle-ear disease.

DR. ST. GEORGE T. GRINNAN, Richmond, Va.—I wish to mention that we may have fever as the result of overexercise in certain children. I have had a blood examination made in such a case and found a high leukocyte count, 13,000, and low hemoglobin. Rest entirely restored this child in two weeks time.

DR. JOHN LOVETT MORSE, Boston.—I would like to call attention to a lack in our knowledge and that is as to what the normal variation in temperature is in children. Again we must be sure that the thermometer is right before we say that a child has a temperature. As to dentists, we have many dentists that are two generations behind the times. The child may have an infection and the teeth may look all right. They may even be filled and apparently in good condition and yet an x-ray examination may show an abscess at the root of a tooth. Furthermore, we must not rule out the ear as a possible source of trouble just because the drum looks normal. We must also remember that a child may have disease of the ethmoid cells and antrum that may be the cause of the symptoms. Nothing has been said about the urinary tract; that has been left out but the possibility of an infection in this locality being the cause of fever must not be overlooked.

DR. CHARLES GILMORE KERLEY.—I will confine my discussion to a hypothetical case. Dr. Morse had called attention to the necessity of stabilizing our ideas as to what a normal temperature is, or how much the temperature may vary within normal limits. I do not consider a temperature under 100° abnormal. When we have a child that runs a temperature above 100° F., the temperature is not normal but suspicious. We see many cases in which the cause of such a temperature cannot be found. Such a child should be put to bed. If his condition is due to infection putting him to bed will have no effect on the temperature, but if the temperature is due to a nervous condition the rest in bed will reduce it. When we find a child of this type we can tell the family to throw away the thermometer or to give it to someone they do not like.

DR. EDGAR P. COPELAND.—I wish to emphasize that I did not attempt to discuss all the causes of obscure fever. We are all familiar with the fact that undue exercise may cause a rise in the temperature. I said nothing of infection of the urinary tract because this subject has received so much attention during the past year that we are all on the alert for pyelitis. The question of what is the normal temperature is important but in most cases I think we allow for a reasonable variation.

DR. F. M. POTTENGER, Los Angeles, read a paper on

THE NATURAL PROTECTION OF THE CHILD AGAINST TUBERCULOSIS
AND GRADUAL DEVELOPMENT OF A SPECIFIC CELLULAR DEFENSE.

It is now quite generally recognized that childhood is the time in which infection with tuberculosis occurs and that if we could prevent adult tuberculosis we must prevent infection in childhood, therefore, the prevention of tuberculosis lies in the hands of the pediatrician. Most adult tuberculosis is simply the stirring up of a latent infection acquired in childhood. In the defense of the body against tuberculosis the lymphatics are important. We have two kinds of defenses, the humoral and the cellular, but neither are specific. In early life the child comes into contact with various kinds of bacteria and gradually develops immunity by producing specific enzymes and until these enzymes are developed he must depend for protection on the lymphatics for defense. The tonsils are lymphatic structures whose function is that of defense. The fact that tonsils are enlarged is not evidence that they should be removed. When other lymphatic structures are enlarged we do not think we must remove them. The reason they are enlarged is because they are coming into contact with bacteria and they are enlarged for the purpose of performing the greater amount of work required for them. While tonsils must not be removed just because they are enlarged they must be removed if they are diseased. The fact that a few tubercle bacilli are found in the tonsil is no reason why they should be removed since the function of the tonsil is one of defense and the tubercle bacilli will be destroyed before they pass through. In early life we may find bacilli passing through the tissues but when cellular defense is established they no longer do this. This is the reason we may get

a glandular infection in childhood and a surface infection in the adult; so-called clinical tuberculosis is a surface infection. The bacilli do not pass through and involve the lymphatics but involve the tissues themselves. Therefore, we should not sacrifice the tonsil or any tonsillar tissue unnecessarily until the lymphatics have had time to defend themselves.

DR. JOHN RITTER, Chicago.—I am more than pleased to hear this forcible attempt to stop the promiscuous removal of the tonsils. I think we have been too radical. The lingual tonsil and the tonsil proper and adenoids are infantile organs, placed where they are for the purpose of stopping the entrance of bacilli into the body. Tuberculosis is a different proposition in the child from what it is in the adult. I wish to emphasize particularly the necessity of protecting and guarding the entrance through which infection may come as much as possible. If the tonsils are diseased they should be treated but they should not be removed unless absolutely necessary. I may make the statement that we have records where the tonsils have been removed and where within six months or a year the operation was followed by active tuberculosis.

DR. JOHN JAHORSKY, St. Louis.—This process of developing immunity in the child means not only immunity to tuberculosis but to other germs. The child becomes immune to a great variety of germs. We do not see children so often after they reach the age of five, six, or seven years, as by that time infections are more easily thrown off, whereas the baby goes through a very severe reaction in order to throw off an infection. The tonsil is the first line of defense in the young child and if we remove much of the tonsillar ring we may have an infection such as bronchopneumonia or lymphadenitis. We must conserve Waldeyer's ring. We must try to get out any pus that may be there but we should not be too ready to rip out the tonsils.

DR. JAY I. DURAND, Seattle.—The tonsil is a lymphatic gland but unlike other lymphatic glands is open instead of being closed over. In its present condition the tonsil is a wide open avenue of infection. The crypts may act as a culture tube. It is often difficult to say which tonsils should come out and which should not come out. It seems to me that perfectly smooth scar tissue is a better defense than a diseased tonsil. I do not think there is more infection in children after the removal of the tonsils. The general resistance is improved by the removal of tonsils. I would like to know why the bronchial glands are not as good a means of defense as the tonsils.

DR. T. C. McCLEAVE, San Francisco.—I am in sympathy with the last speaker. I feel that it is safe to err on the side of too frequent operation rather than upon the other side. The tonsil doubtless does have a protective function and this function is very easily lost. I think clinical experience justifies the statement that in a large proportion of children that are readily infected the tonsils are diseased. On the whole I think there are fewer infections which have their portal of entry through the throat in children who have had their tonsils removed. I cannot agree with the speaker that there are a

greater number of bronchial infections after the tonsils have been removed.

DR. ST. GEORGE T. GRINNAN, Richmond, Va.—I have observed a rather peculiar thing and that is that young negroes seldom have tonsillitis and yet there is a large amount of tuberculosis of the lungs among them. Among the white children there is a considerable amount of tonsillitis and one seldom sees tuberculosis of the lungs, but a great deal of gland tuberculosis. At the same time there is a large number of children that have to have their tonsils removed. If the adenoids are removed first it is sometimes not necessary to remove the tonsils.

DR. F. P. GEGENBACH, Denver.—I did not hear all that Dr. Pottenger said but I would like to ask him two questions. First, how much importance he places on the persistent enlargement of the anterior cervical glands and whether he would advise the removal of the tonsils in these cases? In the second place I would like to ask him whether he would remove the tonsils in the presence of a tuberculous adenitis.

DR. CHARLES GILMORE KERLEY, New York.—I do not understand whether Dr. Pottenger would allow diseased tonsils containing tubercle bacilli to remain in the throat. I think this is faulty teaching. I think that a diseased tonsil should not be allowed to remain in the throat, but we must be able to judge what constitutes a diseased tonsil. The tonsil has a function in the development and shaping of the throat and its removal should be avoided until the child is three or four years of age. If the tonsils are removed while the child is very young adhesions between the pillars result and there is a narrowing of the throat and a tendency to dryness of the throat. However, I think it is as important to remove a diseased tonsil as a diseased appendix. Another point and that is the effect of the tonsils during infectious and contagious diseases. In measles, grip, etc., the tonsil furnishes a site of infection as well as a method of prophylaxis against infections. A good normal resistance is a very important thing. I have never seen tuberculous adenitis in a child properly operated upon and I have yet to see tuberculous glands in children in whom the tonsil was thoroughly eradicated.

DR. F. M. POTTENGER (closing the discussion).—Referring to Dr. Kerley's remarks, he says he has never seen tuberculous adenitis after removal of the tonsils, this means that the bacilli have passed through and taken to the secondary lines of defense. I would not allow a focus of infection to remain. My point is that a child has no other defense than the natural defense offered by the lymphatics at birth and that he gradually comes into contact with bacteria and builds up immunity. I would not remove the tonsils for tuberculous adenitis because I do not think the tonsils are at fault.

DR. J. P. SEDGWICK, Minneapolis, Minn., read a paper entitled

PEDIATRIC NURSING.

My object in this paper is to point out the influence of minor conditions on the outcome of a case. I will only indicate a few points

that seem to me most important. The present method of charting cases has become so cumbersome that a great deal of time is consumed in interpreting a chart. I have devised a plan for graphic charting by which the condition of the child in respect to weight, temperature, feeding, etc., may be grasped in a minute. This is done by plotting the curves. A surprising amount of information can be conveyed in this way by a mere inspection of the chart. By aseptic nursing in childhood a large amount of cross-infection can be prevented. When a nursing mother has a respiratory infection, such as grip, cold, etc., she should wear a mask of two layers of gauze over her mouth and nose when nursing her infant. It should be remembered that other members of the family and visitors are often a source of danger to the child. In order to prevent cross-infection in the hospital we have been placing the beds of the children 7 feet apart with a partition of two layers of gauze between them. An experience with vulgovaginitis has taught us the importance of bathing female infants on a slab with running water. The cases cited include a number that show that the condition of premature and atrophic infants varies directly with the attention that is given them with reference to regulation of the temperature, etc. In one instance too much warmth caused a rise in the temperature of the infant to 106° F. In other instances insufficient heat has caused a subnormal temperature. The importance of a urinary analysis is something frequently overlooked in infants. I have devised a modification of the Lawrence apparatus for collecting urine in female infants. The point that I would like to emphasize is that frequently the painstaking efforts of the physician are spoiled by incompetent nursing.

DR. FRANK C. NEFF, Kansas City, read a paper entitled

REPORT OF FIVE CASES OF TERTIAN MALARIA TREATED WITH SYNTHETIC ARSENIC INTRAVENOUSLY.

Arsenic has been used in malaria of the tertian type with satisfactory results but it has done little good in other types of malaria. The five cases which I wish to report all show a striking similarity. The plasmodium was demonstrated in the blood in each instance. After the administration of the diarsenol the plasmodium disappeared from the blood. Two or three decigrams was the dose administered. After this there was a cessation of the chills and fever and a disappearance of the plasmodium. In several of the cases the chills and fever recurred and the plasmodium reappeared. The treatment was repeated with the same results as in the first place. Several of the patients had been lost sight of and in the others it was too soon to say whether they would remain cured or not. In one case the spleen had not yet returned to its normal size. It was probable that the doses used were too small. There had been no reaction that would contraindicate the use of either salvarsan or neosalvarsan; it could not be said whether the patients did better on salvarsan or neosalvarsan. While these agents had caused the disappearance of the organisms from the blood, no conclusions could be drawn as to the permanence of the cure. Perhaps better results

might be obtained by different methods of administration and by using quinine as an adjuvant.

DR. JOSEPH BRENNEMANN, Chicago, read a paper on

THE USE OF BOILED MILK IN INFANT FEEDING.

We may state that boiling destroys the bacteria in milk but it does not destroy all the toxins of the bacteria; a clean milk should be free from toxins. Epidemics of infections could not occur if milk was boiled in the home. There is an impression that boiled milk causes constipation, but we know that boiled milk is easily digested and we give it during digestive disturbances. It would seem that if boiled milk is good for the sick baby there is no reason why it should not be good for the well baby. Boiled milk has advantages over raw milk both from the bacteriological and the physiological standpoint. The physiological advantages may be explained by the difference in coagulability between boiled milk and raw milk. Boiled milk forms curds so hard in some instances that they cannot be expelled by vomiting, while on the other hand the curds of boiled milk are finer. Cow's milk is only a liquid in appearance; after it has been taken into the stomach it is not a liquid but a solid. Boiled milk, however, is a fluid. The ultimate test is the baby and how the different forms of milk react on him. If we give the baby raw milk it forms hard curds that can only be acted on by peripheral digestion. Eiweiss milk contains almost invisible curds and this is one reason such good results have followed its use. The curds that are seen in the stools of infants are often ascribed to the fats but if milk is introduced into the duodenum we do not get these curds this is concrete evidence that they are due to the proteins and are formed in the stomach. Again, one never observes bad effects from changing a baby from raw to boiled milk, but the reverse cannot be said. There has been a tendency recently to ascribe all digestive disturbances in infants to the fats and carbohydrates in the food. I feel that the casein is also a factor in the digestive disturbances of infants. The commercial pasteurization of milk is open to objection since the milk is kept for twenty-four hours before using. I consider pasteurized milk as belonging to the raw milk class. If milk boiled at home was as popular as pasteurized milk there is every reason to believe that babies would suffer less.

DISCUSSION.

DR. C. G. GRULEF, Chicago.—This paper is very much in accord with my ideas. Scurvy has been held up as the scarecrow to keep people from using boiled milk. I used boiled milk and boiled certified milk. I have never seen a case of scurvy that could be ascribed to boiled milk. It is a question whether boiled milk is the important factor in the causation of scurvy that it has been thought to be.

DR. HARRY LOWENBERG, Philadelphia.—I do not think the reader of the last paper will need anyone to come to his assistance to-day.

I do not think we can help being influenced by the advice he gives. I have been using boiled milk and I have even been going so far as to use the old-fashioned flour ball. It is an open issue as to whether boiled milk is a factor in causing scurvy. The clinical symptoms of scurvy are so clear that I feel ashamed to say that I come in contact with practitioners who do not recognize it. I have seen cases with subperiosteal hemorrhages given the salicylates. There is no justification for a neglect to recognize the symptomatology of scurvy. I agree with the reader of the paper that the casein of cow's milk may still be considered a factor in the production of indigestion in infants.

DR. C. S. WAHRER, Fort Madison, Ia.—I have been following this section for years and have come to a few conclusions. These may be illustrated by the following incident. One man made the statement that $33\frac{1}{3}$ per cent. of left-handed people were criminals, therefore, left-handedness predisposed to criminality. Someone not so wise ventured the remark, "Yes, but $66\frac{2}{3}$ per cent. of left-handed people are otherwise normal. The same reasoning may be applied to the feeding of babies.

First, we may say that most babies do best on mother's milk; some do well on raw milk; some do well on pasteurized milk; some do well on goat's milk; some do well on ass's milk, and some do well on anything.

DR. PHELPS.—I want to ask whether anyone has found that raw milk has anything to do with causing urticaria. I had a child that was getting boiled milk. It was changed to raw milk and developed urticaria. The urticaria did not disappear until the child was put back on boiled milk.

DR. JULIUS H. HESS, Chicago.—Any of the disadvantages held against boiled milk may be overcome by giving fruit juices and vegetables earlier. Some children take more milk when they are given boiled milk than when raw milk is fed. I have found that frequently boiled milk was being given much in excess of the requirements of the child. This was not true of babies with a tendency to rickets. If one gave these babies codliver oil they could handle considerably more calcium. There is one other point and that is in regard to infections and that is that there are fewer cases of intestinal infection where boiled milk is used. We have practically no gas bacilli infections; we have had two cases in two years. I used to take my vacation in the winter because there were so many of these infections in the summer, but now I take my vacation in the summer since we have been feeding the babies boiled milk.

DR. L. R. DEBUYS, New Orleans.—I first used raw milk, then pasteurized milk, and now I am using boiled milk. I always make it a point to be sure that I first have pure milk. I am now teaching that as soon as the feeding of boiled milk is begun orange juice must be added to the diet.

DR. T. C. MCCLEAVE.—I am in entire agreement with the reader of the paper and I never speak on the subject of milk that I do not insist that milk should be clean and should be cooked. The commer-

cial pasteurization of milk is a fallacy, but milk cooked in the home will convey no infections.

DR. J. H. M. KNOX, Baltimore.—Through pasteurization we have left down the bars to dirty milk. Pasteurized milk is dangerous. Departments of health should see that the milk is good before it is pasteurized. In some parts of the country an increase in scorbutus has been noticed, but this is rather a trifling matter. I have seen a few more cases in Baltimore and I insist that when babies are one, two, or three months of age they be given orange juice.

DR. CHARLES GILMORE KERLEY.—Sweeping statements on this subject are not wise. We should look at this subject from the broad standpoint. Personally I prefer raw milk, but only a comparatively small part of the human family can have pure raw milk inasmuch as it cannot be provided. The next best thing is boiled milk. Cooked milk is more rapidly digested and more assimilable than raw milk. You may remember that I never swallowed the inference that casein of cow's milk was not a factor in the production of digestive disorders of infancy. There is no doubt that cooking the milk produces a larger proportion of cases of scurvy. Orange juice or some other fruit juice should be given as soon as the baby is put on cooked milk. The nutritional value of milk is not interfered with by cooking if this is done in the presence of starch and a little alkali.

DR. B. RAYMOND HOOBLER, Detroit, read a paper on

THE USE OF MALT SOUP EXTRACT IN INFANT FEEDING.

There are certain conditions met with in infants in which malt soups has proved a useful adjunct to the dietary. The prescribed formulæ accompanying the preparation, however, are not suited to meet all conditions. One objection to these formulæ is that they call for wheat flour cooked but a few minutes. I have prepared a number of formulæ illustrating the various modifications that may be made with malt soup. These formulæ may be greatly varied by adding a well-cooked cereal, a cereal cooked at least an hour. One may then select that kind of milk that seems best suited to the case under consideration, either boiled milk, pasteurized milk, or raw milk. In choosing the cereal we may remember that starches do not all hydrolize with the same rapidity.

If the sugar is released rapidly there is increased peristalsis and the stools are increased. Oatmeal acts as a laxative because it loses its sugar more rapidly during fermentation. Because of the difference in the intestinal flora all children do not handle the same starch in the same manner. In some infants there is a preponderance of Gram negative and in others a preponderance of Gram positive bacilli in the stools and the starch chosen must depend upon the character of the flora. By the formulæ presented malt soup may be used in modifications that can be adapted to a large variety of conditions.

DR. J. I. DURAND, Seattle, read a paper on

THE INFLUENCE OF DIET ON THE DEVELOPMENT AND HEALTH OF THE
TEETH.

I wish to present the results of an investigation of the incidence of caries in teeth of 5000 children with reference to feeding in infancy. The highest percentage of caries was found among those fed on sweetened condensed milk. The percentage of caries among children who had been breast-fed was 28 or 29 per cent.; among those fed on sweetened condensed milk 61 per cent. A well-balanced diet has a direct influence on the development and the health of the teeth. Breast milk or properly modified cow's milk with the early addition of vegetables has been shown to be a suitable diet; certain vegetables may be given as early as the sixth or seventh month of life and are a valuable addition, preventing rickets and spasmophilia. A second point of importance is to provide a diet that teaches the child the proper function of the jaws and teeth. For this purpose hard foods are useful, such as dry bread, celery, lettuce, etc. These give additional work to the teeth and jaws and further proper development. One of the points in the prevention of caries is that the last article eaten at a meal should not be as is customary, a soft, sticky, carbohydrate food, as cake, but some hard, cleansing food, as meat, a green salad, or some fibrous food. A hard food and vigorous efforts at mastication have a function in wearing down any roughness of the teeth. An examination of the skulls of primitive races gives confirmative evidence that the character of the food has an influence in the development and health of the teeth. A study of Maori skulls showed that in these the incidence of caries was only 0.76, while among Maori children to-day in a civilized environment the incidence of caries is 15 per cent. In the North American Indians the incidence of dental caries was from 1.0 to 3.9 per cent. It is shown to be low in other primitive races.

DR. J. H. MASON KNOX, Baltimore, read a paper on

THE REGULATION OF CHILDREN'S DIET AFTER INFANCY.

During the last one-half century a great deal of study has been given to infant feeding and nearly every clinician has a method of his own, some of these very far removed from the normal diet of the infant. With all this study of the dietetic needs of the infant it seems rather strange that so little attention has been given to the diet of the growing child when he has passed infancy. Few studies have been made to find out the average caloric requirements of children of different ages. It has been estimated that 100 calories per kilo or 45 per pound is about the average requirement of a baby one year of age. We have worked out tables showing the average amount of each of the food elements required at the different ages. After the first year the proportion of protein in the diet is gradually decreased while that of the carbohydrate is gradually increased. After the first year the child can adapt itself to a wide variation in the

proportion of food elements in its diet. The quantity of fluid required by the child varies widely and is dependent upon temperature, humidity, etc. The mineral requirements of the diet are usually fully met by the ordinary vegetable and cereal in the diet. The tables presented will be found useful as every physician should know how to provide a suitable diet, well-balanced ration for a growing child, one that will be easily digested. The great danger lies in over-feeding. This is well illustrated by the following case: In this child the amount of food was increased in spite of the occurrence of occasional attacks of indigestion. The child was given 2500 calories or 150 per kilo body weight. With this amount of food she continued to have digestive disturbances, was nervous, irritable, and restless. When the number of calories was reduced by one-half she immediately became much better. This case is no exception. At the age of six years about 4 grams of protein is the average amount in the daily diet; at ten years the protein has been reduced to 2 grams. One-half the protein should be given in the form of animal protein. As the amount of protein is decreased the carbohydrates are increased. Too little carbohydrate may lead to acidosis. The carbohydrate values of the food do not vary so widely as the amount of water. While it is well to have tables showing the relative amount of calories and the proper proportion of the various food elements as a guide, it is not necessary to be extremely accurate. It is also an advantage to have three or four daily diet lists with a number of substitutes for the different foods. I have not discussed the alteration in diet in disease, but it is possible by a careful adjustment of the diet during disease to keep the child along without materially lowering the calories and in this way the child may be carried through an illness without a marked loss in weight.

REPORT OF A COMMITTEE ON THE INVESTIGATION OF DIARRHEAL DISEASES.

DR. JOSEPH I. GROVER presented a statistical study of diarrheal diseases in Boston for the year of 1915.

This study was undertaken with the hope of throwing some light on the etiology and prophylaxis of the diarrheas of infancy. It is based on 14,000 visits made to 600 cases of diarrhea. A few of the cases were from hospitals but most of them were from the clinics of Boston. There was no one nationality that predominated. About 70 per cent. of the mothers were foreign born. About 56 per cent. of the cases were males; this proportion held for babies and for younger and older children. Over 80 per cent. of the cases were under one year of age when first seen. Babies two, three, or four months old were most susceptible; there were very few cases after the third year. The death rate was almost double in children prematurely born or under weight at the time of birth. A rather large proportion of the cases had been weaned in March, April, or May, and it seemed that weaning in the spring had a definite relation to diarrhea in the summer. Among babies weaned in December just about Christmas and in January there seemed to be a larger amount

of diarrhea; this is probably due to the overfeeding in connection with Christmas. A study of the mortality rates for July, August, and September in connection with the temperature and humidity during those months showed that the absolute humidity had a larger influence on the mortality from the infectious diarrheas than any other one factor. Of the babies under one year of age having diarrhea, $33\frac{1}{3}$ per cent. were fed on proprietary foods and of all those in the series 40 per cent. were fed on proprietary foods. In 54 per cent. of the cases the diarrhea was due to carbohydrate fermentation. The statistics with reference to the feeding and treatment of these cases were very complicated, 37 per cent. receiving simple cleansing treatment; in 25 per cent. there was a reduction of the sugar in the food. Nearly all forms of treatment in children over one year of age were successful. The mortality of children under one year of age was 6.9 per cent. About 2 per cent. of the older children died. From this investigation it was very difficult to draw conclusions or to say that one or two factors were responsible for the diarrheas. The same factors seemed to be at work in all parts of Boston. Children who were not up to the standard physically seemed to be more susceptible. Those weaned in the spring seemed to be susceptible and likewise those nursed over twelve months. Children with other diseases were more susceptible to summer diarrheas than well children. The best treatment seemed to be catharsis followed by giving sugar water. Next to carbohydrate fermentation the most important factor in causing diarrhea was the susceptible physical condition of the children.

DR. HENRY F. HELMHOLZ, Chicago, presented an analysis of the mortality of 1915 as shown by the Infant Welfare Society of Chicago. This organization had twenty-one milk stations and cared for 9313 babies during 1915. Among these there were 300 deaths. Of these 300 babies only fifty-four were of American birth. The statistics show in a most striking manner the relation of poverty to the incidence of the diarrheas of infancy. One-half of the babies that died were under three months of age. Over 60 per cent. of the mortality occurred in July and August and the death rate during August was higher than during July. Most of the babies attending the milk stations gained normally until they were weaned and most of the disturbances occurred in children whose feeding was not supervised. The ratio of diarrheas in artificially fed and breast fed babies was as six to one. These statistics bring out in a striking manner the beneficial effect of the work done by the milk stations and also that the visiting nurse is an exceedingly potent factor in lessening infant mortality among the poor foreign population.

DISCUSSION.

DR. HENRY DWIGHT CHAPIN, New York.—The statistics give a very different impression from those we have had in New York. Dr. Helmholtz says that they had a higher death rate in August than in July. Some years ago I made a study in New York, covering five consecutive years, and found that the mean temperature of

July was 2 per cent. higher than that of August, and that the mortality was higher for July than for August. Another very unusual thing in these statistics is that the mortality rate from respiratory diseases is greater for August than for March. We have found in New York that the highest mortality rate during hot weather is not on the hottest days, but a few days after the hot spell.

BRIEF OF CURRENT LITERATURE

DISEASES OF CHILDREN.

A Previously Undescribed Form of Postdiphtheritic Paralysis; One-sided Paralysis of the Hypoglossus.—Frieda Lederer (*Arch. f. Kinderheil.*, Bd. lxxv, Heft III-IV, 1916) gives the history of a case of diphtheria in which postdiphtheritic paralysis occurred in some of the usual locations, followed by a one-sided hypoglossus paralysis characterized by lateral deviation of the tongue, and lack of taste on one side of the tongue, while temperature, touch, and pain reactions in both sides of the tongue remained normal. The boy, aged ten years, suffered at first with speech difficulty, nasal voice, and double vision. The palate remained motionless in speech. After electrical treatment these troubles disappeared, as did the hypoglossus symptoms later.

Protection of Infancy in France.—A. Pinard (*Ann. de gyn. et d'obst.*, March-April, 1916) continues his account of the results of public care of the "war babies" in Paris. His first account was of the first five months of the war. The present one includes an entire year. The work included the care of every woman known to be pregnant whose husband was at the front, who was a war widow, or whose child was the result of a conception with a soldier out of wedlock. The accommodations in maternity hospitals were increased, advantage was taken of all private charities in this line of work, the distribution of sterilized milk was much increased, and homes were provided for nursing mothers who were homeless. The results of this care have been a decrease in mortality of infants at birth and of puerperal women; a diminution of mortality of infants between one day and three years of age; a lessened number of abandoned infants; and an increase in the duration of pregnancy and in the weight of the new-born. During the first year of the war births registered numbered 37,085, of which 24,431 occurred in maternity hospitals. In the refuges for nursing mothers 4000 children were cared for with their mothers, and only fifteen died. The author believes that these results have justified a permanent public assistance for pregnant women and nursing mothers in Paris.

Weather in Relation to the Prevalence of Scarlet Fever and Diphtheria.—Th. Banda (*Arch. f. Kinderheil.*, Bd. lxxv, Heft III-IV, 1916) discusses the relation of weather to the prevalence of scarlet fever and diphtheria, taking the climate of Berlin as an example.

There occurred in the city, from 1904-1907, 22,210 cases of scarlet fever and 33,295 of diphtheria. He states that weather consists of a number of different factors, such as temperature, pressure, moisture, cloudiness, sunshine, precipitation of rain, wind, radioactivity, ozone content, electromagnetic conditions, etc. By plotting a curve of these various factors and comparing them with the curves of monthly incidence of scarlet fever and diphtheria he arrives at certain conclusions. He considers both mortality and morbidity. The smallest amount of disease in Berlin occurs at the time of the damp sea wind, the west wind, which blows in summer. From September on this changes. In October begins the east wind, the continental wind, and the fall of rain is slight. The sickness at this time reaches a high point, diphtheria being at the highest in November. The dry continental wind appears to spread about the causative materials of these diseases. The bacilli of diphtheria become easily transportable on account of their drying. In March and May when the dry winds blow again there is a renewal of the disease incidence. In spite of the differences in temperature, sunshine, dampness, precipitation, and wind between summer and autumn the difference between highest and lowest points of the curve of these diseases in diphtheria is 14.5 per cent., in scarlet fever 12.9 per cent., and in spite of the likeness of spring and autumn in regard to the components of weather the difference in the number of cases of sickness is only 10 per cent. The author concludes that meteorological influences have little to do with the occurrence of these diseases. In scarlet fever the smallest morbidity and the largest mortality occur in July; in September and October the opposite occurs. Other factors complicate the problem, such as the school vacation, and the going away from home of the well-to-do people. The influence of weather on the human body cannot be denied. The sirocco, barometric depression, and electrical conditions affect it markedly. Rheumatism and gout are affected by weather. Neurasthenics are also subject to depression from weather conditions. The same influences may also affect the incidence of infectious diseases, causing it to be greater.

Gaucher's Disease in Infants.—J. H. M. Knox, H. R. Wahl and H. C. Schmeisser (*Bull. Johns Hopk. Hosp.*, 1916, xxvii, 1) report the cases of two infants, sisters, who did not thrive from birth and died, one at eleven months, the other at fifteen months of age, from gradually increasing weakness. The most striking clinical feature was the great enlargement of the spleen and liver. The blood picture was that of a moderate anemia. The leukocytes were rarely increased, and for the most part were markedly reduced in number. The skin in both cases had a peculiar yellowish-brown hue, more marked on the face and exposed surfaces. In one case the diagnosis was confirmed during life by the examination of an excised lymph gland. Microscopically, in both cases nearly all the organs were found to contain large, pale, granular or finely vacuolated cells, in which there was a peculiar refractive substance having the chemical and staining properties of lipoid material. These cells are apparently identical with those described by Gaucher,

and later by a number of observers, in the condition called Gaucher's disease. The above cases and that of Niemann are the only ones in which the disease has been reported in infancy. The observation of cherry-red spots in the maculæ of one case, in view of the presence of similar cells in the nervous tissues of cases of amaurotic family idiocy suggests the possibility that the essential degeneration in the latter condition may be of similar character.

Cure of Suppurative Meningococcal Iridochoroiditis by Injection of Antimeningococcal Serum into the Vitreous.—Suppurative iridochoroiditis is a complication of cerebrospinal meningitis associated with the development of the meningococcus in the internal membranes of the eye. The prognosis is very unfavorable. Within four or five days it almost invariably ends in suppuration and atrophy of the eye with loss of vision. Antimeningococcal serum treatment has probably reduced the frequency of this complication, but has not diminished its gravity. The resistance of meningococcal iridochoroiditis to intraspinal serum treatment should not surprise us. It is due to the same causes which are responsible for the failure of antimeningococcal serum when injected subcutaneously in cerebrospinal meningitis. Like the arachnoid cavity, the internal media of the eye are almost completely independent of the general circulation. A. Netter (*Brit. Jour. Child. Dis.*, 1916, xiii, 13) has therefore been led to think that if to cure cerebrospinal meningitis it is necessary to inject serum into the spinal cavity, meningococcal iridochoroiditis should be treated by the intraocular injection of the serum. This he has done on two occasions in children. In the first patient, a girl aged six years, suffering from severe cerebrospinal meningitis complicated by suppurative arthritis of the left elbow and right knee, the anterior chamber of the right eye was more than half filled by an hypopyon. The operation consisted in the injection of several drops of Dopter's serum into the vitreous and in a puncture of the anterior chamber, which did not, however, withdraw sufficient fluid for microscopical examination. The aqueous humor rapidly resumed its transparency, the iris regained its natural color, and vision was recovered. A year later the child could clearly see every detail with the right eye. She only presents an immobility of the pupil as the result of synechiæ. Suppurative arthritis of the elbow and knee, which were also treated with local injections of serum cleared up very quickly, and the joints are at the present moment perfectly normal. The second patient, a boy, aged two and one-half years, was admitted on the fifth day of severe cerebrospinal meningitis. On the following day he presented injection of the left conjunctiva. This injection was much more marked the following day, and was accompanied by palpebral spasm. Examination showed a lateral hypopyon (the child was lying on the right side) and a yellow film filling the pupillary area and situated in front of the lens. Puncture of the anterior chamber yielded a little pus, which contained quantities of intra- and extracellular meningococci. Injection of 1 c.c. of serum into the vitreous was followed by detachment and progressive absorption of the exudation in front of the lens.

The conjunctiva resumed its natural color. The photophobia disappeared and the child could see clearly. The iris resumed its natural color and reacted to atropine, and recovery will doubtless be complete.

Value of the Wassermann Reaction in Mental Deficiency in Children.—A. Gordon (*Arch. Pediat.*, 1916, xxxiii, 273) has studied, especially from the standpoint of hereditary syphilis, seventy-five children who presented mental defects of various degrees. Of these, 50 per cent. presented a positive serum reaction and in seventeen cases in which the spinal fluid also was obtained, the Wassermann tests ran parallel in both, except in three cases of the feeble-minded with functional disorders. Children up to the age of five were given mercurials and iodids. From that age on the treatment commenced with neosalvarsan, then continued with mercury and iodids. The intraspinal method of salvarsanized serum was used exclusively on children of fifteen and sixteen years of age and was supplemented by mercury and iodids. Improvement in general health was observed in every one of the cases with a positive Wassermann reaction. As to the defective mentality, the idiots and genuine imbeciles remained unresponsive to the treatment. The imbeciles with organic changes in the central nervous system, the hemiplegics and monoplegics were not influenced by the treatment. The feeble-minded with epilepsy, on the contrary, showed decided improvement. The younger the child and the more prolonged the treatment the more rapid and the better were the results.

Congestion in the Treatment of Epidemic Cerebrospinal Meningitis.—D. Forbes and E. Cohen (*Lancet*, May 27, 1916) advocate congestion of the cerebral vessels brought about by raising the foot of the bed, so that the bed and the patient's body, no pillow being allowed, make an angle of from 14 to 23 degrees with the floor. He reports five cases to show that the method influences the course of the disease profoundly. It does not interfere with concurrent treatment. In mild cases in a few days a normal temperature and free movement of the head result, and the recovery is uninterrupted. In more severe cases the temperature rises and the patient more gradually recovers, the recovery being at first accompanied either or both by increased tension of cerebrospinal fluid and a greater migration of polymorphs. If the foot of the bed has been raised too high there may be very severe headache and persistent vomiting due to a too great congestion and its results. In such cases, if the bed is lowered and the tension is relieved by puncture, the patient gradually recovers. As different cases require varying degrees of stimulation, no hard-and-fast rule can be laid down as to the height to which the foot of the bed should be raised. At first this method of treatment was tried only in cases which threatened to become chronic; but good results have followed its application in the early stages of the disease. In the more chronic cases the bed should be raised first on blocks and rapidly higher until the patient begins to show a marked reaction or a more freely movable neck. At that point heightening should stop and the patient be allowed gradually to

recover, the foot of the bed being left continuously raised until some seven days after apparent recovery, and thereafter gradually lowered. Patients should lie on their backs as much as possible during treatment, and should have no pillows. When there is marked retraction and the patient cannot lie on his back the bed should be tipped sideways and the patient's head be allowed to hang over the lower edge. This method is particularly useful for children, but as it is somewhat drastic it has not been practised for more than two hours at a time. It is always a serious mistake to puncture a patient who is progressing toward recovery, or who has apparently recovered.

Bacillus Dysenteriae as a Cause of Infectious Diarrhea in Infants.

—C. Ten Broeck and F. G. Norbury (*Bost. Med. and Surg. Jour.*, 1916, clxxiv, 785) say that negative bacteriological and agglutination tests for the dysentery bacillus in cases of infectious diarrhea of infancy are of comparatively little value, and in making the agglutination test a number of cultures must be used for the agglutinogens. In spite of these facts the dysentery bacillus was isolated from 74.6 per cent. of the cases studied. Only fourteen of the nineteen bacteriologically negative cases were studied for agglutinins, and 64.3 per cent. of these, or 12 per cent. of the total number, gave a positive reaction, thus making a total of 86.6 per cent. of the seventy-five cases in which there was good evidence that the dysentery bacillus was present. They have been unable to obtain any evidence that *Bac. welchii* is ever the cause of infectious diarrhea and all of their results point to the dysentery bacillus as the etiological agent. In their cases all these bacilli belonged to the mannit-fermenting group. In spite of the apparent scarcity of dysentery bacilli in the feces, they believe that they are the cause of infectious diarrhea of infancy for the following reasons: (1) their universal association with the condition; (2) the great numbers of these organisms in the mucosa of the cecum; (3) the sick individual produces immune bodies against them while such bodies, specific for the other assumed etiological agents, have not been demonstrated; (4) experimentally they are known to produce a diarrhea.

Congenital Obliteration of the Bile Ducts.—J. B. Holmes (*Amer. Jour. Dis. Child.*, 1916, xi, 405) records a case of this lesion, with autopsy notes, as discusses its diagnosis and treatment. He says that congenital obliteration (atresia) of the larger bile ducts is not an extremely rare condition. Accumulating evidence tends to show that the condition is usually a developmental anomaly and not the result primarily of inflammatory processes. In at least 16 per cent. of all cases yet reported the anatomical relations are such that operative relief is theoretically possible. Recent surgical experiences in young children afford clinical basis for such hopes. In view of the otherwise hopeless nature of the case, the biliary tract should be explored as soon as the diagnosis is sufficiently established, and if the anatomical relations permit—16 per cent. of published cases—an artificial passage for the bile to the duodenum should be made. When for any reason this cannot be done at the time of exploration, an external outlet for the bile should be provided. A repair opera-

tion may be attempted at a later date. Meanwhile the child's nutrition should be maintained by the administration, if necessary, of bile or bile salts.

Nonprotein Nitrogenous Constituents of the Blood and the Phenolsulphonephthalein Test in Children.—In a series of fifty children free from evidences of renal disease, chemical examination of the blood by J. S. Leopold and A. Bornhard (*Amer. Jour. Dis. Child.*, 1916, xi, 432) gave the following results: The total nonprotein nitrogen varied between 19 and 40 mg. per 100 c.c. of blood, the average being 28 mg.; the urea nitrogen varied between 8 and 21 mg., the average being 12 mg.; the uric acid varied between 0.6 and 3.2 mg., the average being 1.8 mg.; the creatinin varied between 0.5 and 4 mg., the average being 1.5 mg.; and the phenolsulphonephthalein varied between 50 and 96 per cent., the average being 70 per cent. A smaller number (16) of cases with renal involvement were examined. Although this series is not large enough for final conclusions, the following hold true for the cases studied: In acute nephritis the nonprotein nitrogen constituents were found within normal limits; the phenolsulphonephthalein excretion was diminished. In chronic nephritis the nonprotein nitrogen constituents were usually increased, while the phenolsulphonephthalein excretion was diminished. In passive congestion the nonprotein constituents were normal while the phenolsulphonephthalein was diminished. In one case of sarcoma of the kidney with normal urinary findings the nonprotein constituents, with the exception of uric acid, were normal. The latter was slightly increased. The phenolsulphonephthalein excretion was diminished. Figures for the nonprotein constituents of the blood as well as for the phenolsulphonephthalein excretion of children free from renal disease are practically identical with the figures obtained from adults, and vary within the normal limits as the adult figures vary. The changes in these figures in children the subjects of renal disease corresponds, in this series of cases, with the changes observed in adults. The importance of the tests for diagnosis and prognosis, amply demonstrated in adults, will, in all probability, hold true for children, although more cases are required definitely to establish this view.

Cutaneous Reaction from Proteins in Eczema.—It is well known that many children, the subjects of asthma, suffer from eczema in infancy or early childhood. Furthermore, patients with an idiosyncrasy to various foods give, with much regularity, a history of eczema in infancy. It is, therefore, of interest to determine the frequency of protein reactions in eczema, to see if a relation exists between the disease and protein sensitization and to observe the effects of variations in the protein of the food upon the course of the disease. Of forty-three patients without eczema studied by K. D. Blackfan (*Amer. Jour. Dis. Child.*, 1916, xi, 441), only one showed any evidence of susceptibility to protein by cutaneous and intracutaneous tests. Of twenty-seven patients with eczema, twenty-two gave evidence of susceptibility to proteins. Egg white, cow's milk and woman's milk were the substances that most frequently caused

a reaction. If there was a reaction from one protein there usually was a reaction from several. The intracutaneous test is more delicate than the cutaneous, but gives results that are more difficult to interpret. The removal of some or all of the animal proteins from the food brings about great improvement in some cases of eczema in older children and adults. With infants it is not successful, first, because it is impossible to feed an infant for a long time upon a diet that contains no animal protein, without the risk of seriously affecting his nutrition, and second, because there is a strong tendency for the eczema to return, even though a protein-poor diet produces early improvement, and even though the protein-poor diet is continued.

Fuller's Earth in Intestinal Disorders of Infants.—Of late the use of kaolin has been recommended for the treatment of a variety of disorders. Influenced by these reports, A. F. Hess (*Jour. A. M. A.*, 1916, lxi, 106) prescribed it in the intestinal disturbances of infants; but dissatisfied with the results, he turned to the use of Fuller's earth. Although these two substances are considered synonymous in the United States Dispensatory and the National Dispensatory they are by no means alike, either in their composition or physiologic action. Fuller's earth was given to a considerable number of normal infants, in order to test its physiologic effect; to this end, 1 ounce of the earth was given in the day's feeding. Its sole effect was that it induced constipation. The stools became firm, dry and formed. The preparation was then given to infants suffering from indigestion, as manifested by diarrhea, accompanied in some instances by vomiting. In these cases, the earth was either added to the food, consisting of the diluted milk, or it was given by teaspoon every hour or two. No difficulty was experienced in giving the powder suspended in a little water, especially when it was sweetened by means of saccharin ($\frac{2}{3}$ grain to 1 ounce of Fuller's earth). In severe cases of enteritis, no food whatsoever was given, but merely teaspoonful doses of this preparation as often as every half hour. In some cases it was fed through the stomach tube—1 or 2 tablespoons being introduced in this way three times a day. This therapeutic agent had a greater effect on inhibiting the diarrhea than bismuth, chalk mixture or other drugs which are commonly used for this purpose. In some cases it has also seemed to exert a sedative effect on the stomach, as judged by the fact that vomiting ceased in the course of this treatment. In no instance were any harmful effects noted.

Tonsils Excretory Organs for Cervical Glands.—S. Blum (*Arch. Pediat.*, 1915, xxxii) makes a preliminary report to the effect that the tonsils are excretory organs for the cervical glands. He claims that chemical substances which he injected into the cervical glands of guinea pigs were subsequently found in the tonsils of these animals. Such chemicals as he employed do not occur normally in the tonsils of the animals experimented upon. He subsequently found the chemical injected into the glands of these animals in their oral cavities. He also recovered from their oral secretions and saw in their tonsils bacteria previously injected into the cervical glands of the animals.

Parapneumonic Empyema.—L. Gerdine's (*Amer. Jour. Dis. Child.*, 1916, xi, 33) fifteen cases of typical lobar or bronchopneumonia in children under four years of age were studied by exploratory puncture and bacteriological examination of the fluid obtained. He says that fluid is present in the pleural cavity in a large number of cases of pneumonia before the crisis and can be demonstrated, sometimes by physical signs, sometimes by Röntgen ray, and by puncture, even when other physical signs are not apparent. The clinical course of the pneumonia may not be altered by this complication. In the majority of cases the fluid is serofibrinous in character, though perhaps containing a large cellular element, polymorphonuclear in type. These fluids are sterile as a rule. True pus is present much more rarely and may contain organisms of more or less virulence. The frequency of the presence of organisms in these cases cannot be decided on the data as yet secured. The virulence of the isolated organisms determined by animal inoculation seems to be of value in prognosis. Only in cases with serofibrinous and purulent fluids containing organisms of a high grade of virulence should surgical interference enter into consideration.

Nutritive Value of Boiled Milk.—The experimental work involved in a report by A. L. Daniels, S. Stuescy and E. Francis (*Amer. Jour. Dis. Child.*, 1916, xi, 45) is the result of an attempt to determine the comparative nutritive efficiency of milk heated to different temperatures. Their results point to the conclusion that milk heated to the boiling temperature or thereabouts is an inadequate food. Rats fed on boiled milk grew to about half their normal size. Although they were able to keep these experimental animals for many months on boiled milk, in no case was there reproduction, nor did any of the animals reach the normal weight for adult rats. Milk which is kept at the boiling temperature for forty-five minutes is no less efficient as a food than milk boiled for much shorter periods—ten minutes or one minute. The chemical changes which make heated milk an inadequate food are brought about at the boiling temperature or thereabouts. The value of pasteurized milk as a food, therefore, will depend on the temperature to which it is heated during the pasteurization process. Heating milk to a higher temperature than boiling (114 C.) makes it even less valuable as a food.

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ORIGINAL COMMUNICATIONS.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

Proceedings of the Twenty-ninth Annual Meeting held at Indianapolis, Ind., September 25, 26 and 27, 1916.

The President, HUGO O. PANTZER, M. D., in the Chair.

PRESIDENT'S ADDRESS.*

BY

HUGO O. PANTZER, M. D., A. M., F. A. C. S.,
Indianapolis, Ind.

THE privilege of Fellowship in this Association came to me at Indianapolis in 1899. The Association had been represented as being composed of men who came to the annual meetings with one purpose, namely, to foster the sciences and arts of obstetrics, gynecology and abdominal surgery. I was told there was tolerated no by-play, no levity in discussions, and no delay over conventional protraction. It was notably a society for its avowed objects, and that in fostering these its members were candid to the degree of being "no respecter of persons". So altruistically was this spirit conceived, that in no instance had this custom interfered with the prevailing good fellowship. I wish here to attest that I have found all this true then and at every meeting since. Fellows, it is my wish that this spirit and course shall prevail at our future meetings!

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

The many advantages that have accrued to me from my yearly pilgrimages to our gatherings have inspired, sustained and helped me for the arduous labors of each ensuing year. I feel that for this benefit I owe lasting gratitude and a debt to this Association.

The honor you have conferred by electing me President, thereby placing me in line with many fine and noble men who have graced this office, is verily a mark of enviable distinction. I assume that your action flows from kind regards for me and as such your act is the source of great pleasure and satisfaction.

Your coming to Indianapolis this year adds further zest to my joy, and I wish to express to you my full appreciation and my most cordial thanks.

For this meeting, there are announced papers by more than one-third of our members. The 49 scientific papers deal with obstetrics 11 times, with gynecology 18, with abdominal diseases 11, and with all three, including general medicine and surgery, 9 times more.

Great grief has come to us during the last year by the death of four active and highly esteemed fellows, namely: Ap. Morgan Vance, of Louisville, Kentucky; Nathan Jenks, of Detroit, Michigan; Frank D. Gray, of Jersey City, New Jersey, and lastly the world-famous John B. Murphy, of Chicago, Illinois.

The memorial addresses for the departed Fellows will be the concluding features of the convention.

The marvelous progress of modern medicine is largely based on the development of cellular pathology, biology and bacteriology. Its history has been so well set forth in recent addresses, that I may pass it over. Further progress in medicine is promised upon an unprecedented scale by recent developments in biochemistry, especially as pertaining to organs having an internal secretion, and by the study of the effects of various toxemias upon the normal physiochemistry of the body. Let us hope that so-called functional diseases will soon be traced to their organic bases, and found curable by organo- and sero-therapy. We may hope to prevent and cure many cellular toxic and bacterial diseases by detoxicating and regulating biochemical agents, which diseases at present do not yield to medicinal therapy, and some of which now have their only hope of cure in mutilating operations. But the profusion of scientific data is as yet little correlated and greatly confusing. It is filling our journals, stimulating thought in all spheres of medicine and surgery, and is made the object of experimental search and research all over the world. However, it is at the stage of nascence, and generally speaking, unripe for specific deductions.

The European war has shown its far-reaching baneful effects nowhere more than in the sudden cessation of the prodigious issue from the many laboratories sustained by the belligerent peoples. It serves to emphasize for us in America the relatively small burden of labor and costs we carry in the production of these bounteous benefits to mankind. It is here we may see an opportunity for further national activity and development. Our country has but few institutions correspondingly equipped for original search and research work, and these are almost all creations by private munificence. They often hold private standing and are not connected with a university scheme. Our states do not yet fully recognize the benefit to mankind coming from and the many reasons making it right and prudent for the state to ordain such institutions.

The prevalent separation in practice of gynecology from obstetrics, deplorable as its bearing is upon the development of the science and practice of either branch, was founded upon the frequent collision of dates between the event of a confinement case and the appointed operation. By their respective character, the time of the obstetrical event is not precisely calculable and the time for a gynecic or abdominal operation has to be predetermined. Unless both events are arranged to occur in one hospital service, it is impracticable to associate the two kinds of cases in the practice of the same physician or service. The hospital, by its appointments, more particularly by its multiple personnel, meets satisfactorily these double needs.

It has been of great concern to the professional mind that woman in her ordeals of motherhood, has commonly not found the fullest assurance for her safe parturient conduct. I recall to your mind the great solicitude expressed by Dr. Zinke, when he announced, only a few years ago, that all other branches of medicine have profited by the modern advance of medical science, that obstetrics alone in its morbidity and mortality has not shown progress. Let us reflect that while many kinds of medical and surgical cases—some relatively trivial as compared with the importance to the state and family of the mother's case—are self-evidently taken to the hospital; that, on the other hand, the lying-in woman procures this boon and guaranty of safety as yet only in fewest instances; and that while in this time of specialization there are many specialists in all other lines of medicine, in obstetrics there are relatively few, notwithstanding the importance and multitude of these cases.

Regarding the former point, the persistent demand of physicians in large cities has already brought it about so that women now consent or even elect to go to the hospital for their obstetric event.

This number is rapidly increasing and has in turn created in many general hospitals special provisions for such cases. The rapidly increasing hospitalization of obstetric cases will demand preparation for them on a new and unprecedented scale. Hospitals solely for women will likely be established everywhere. Some, very properly, will be founded to exist in relation with medical colleges, but a larger number should be provided as separate institutions for the so-called private cases.

Regarding the second point, there are few who specialize in obstetrics to the extent of confining their activity to such practice. There are only a few hospitals throughout the land where obstetric cases collect in numbers to warrant this limitation of practice. In most instances, when the general practitioner in attendance upon a difficult obstetric case wants counsel and aid, it now must come from a fellow general practitioner. In effect the lying-in woman, who is in desperate straits, goes without specialistic skill. Remedy here must be sought and will be found in the reestablishment of the conjoined specialty of gynecology and obstetrics when the hospitalization of labor cases has become the common practice. This change, unfortunately for the needs of the lying-in woman, is still far off. But this matter must be considered early for the proper enactment of this greater concept of medical duty and task.

Gynecic surgery as a branch or integral part of the work of the general surgeon, although practised by many leading general surgeons, contravenes the leading tendency and ideal aim to scientific specialization. It must be condemned as not assuring the exercise of important diagnostic refinement, special knowledge, and advanced skill. These are only obtained by the intensive cultivation of a limited field. One might as well argue that the general surgeon shall take over again the eye and ear, or throat and nose, which attempt would universally be regarded as preposterous and in its effect calamitous. Abdominal surgery by its development has been an outgrowth of gynecic surgery. But more than this correlation, there is a physiological and an anatomical sameness and continuity of structure that will plead for their continued association, both in study and practice.

But whither are we drifting? I cannot close this address without uttering what seems to me shall and will be the ultimate goal and the happy solution of all these perplexing and formidable questions. Medicine and sanitation must be made a *state-function!* Sanitary science, as an arm of the state, already discloses in its edicts that the interrelation of the sick to the healthy is such that the demands of a greater public interest warrant the state to impose, for instance,

quarantine upon the sick and preventive vaccination upon the well. In a state that has nationalized its medicine, the practitioner of medicine under general supervision will correlate these endeavors to effect results. Already such is forecast as where in single instances a group of doctors under one hospital roof unite their efforts for the common patient.

But such generalizations do not meet the immediate objects of this meeting. We have a long and interesting array of papers announced to follow mine this evening.

Fellows, I will here close my remarks with the reiteration of my high appreciation of the distinction you have bestowed upon me.

APPENDICULAR ABSCESS, COMPLICATION, HEM- ORRHAGE, FOLLOWED BY DEATH.*

BY

MAGNUS TATE, M. D., F. A. C. S.,

Cincinnati, Ohio.

IN the practice of abdominal surgery, perplexing problems are constantly met. It is with a twofold purpose that I present the following case report:

First, because I am not cognizant of a similar case in the literature; second, with the hope that in the discussion I may receive valuable information.

A young colored girl asked Dr. White of Covington, Ky., to see her the latter part of March, 1916, because of severe pain in abdomen. The doctor discovered that she had a pronounced tumor in cecal region, and immediately sent the patient to the hospital and requested me to see the case.

Patient, aged twenty-one; unmarried; weight 130 pounds; has had the usual sickness of childhood. No specific or gonorrheal history obtained. She also denied sexual relations. Had always been healthy and strong. Menstruation, regular; lasting about three days. No leukorrhea.

She was taken sick some ten days ago, complaining of severe cramps in the abdomen, accompanied by nausea and vomiting. There was extreme tenderness over the abdomen and a history of chills, followed by fever. Not having been seriously ill before, she thought she had some "stomach trouble," and, therefore, did not ask for medical aid until the pains became very severe and a mass appeared in the right side of the abdomen. Vaginal examination was not made as the hymen was intact, but the rectal touch revealed

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fulness accompanied by pain. An incision through right rectus muscle brought us immediately upon a large tumor mass which was found posterior to and outside of the cecum. After carefully walling off, a wide opening was made with finger to the outside of the cecum, and a large split rubber drainage tube placed to the bottom of the sac. No search for the appendix was made; no mopping

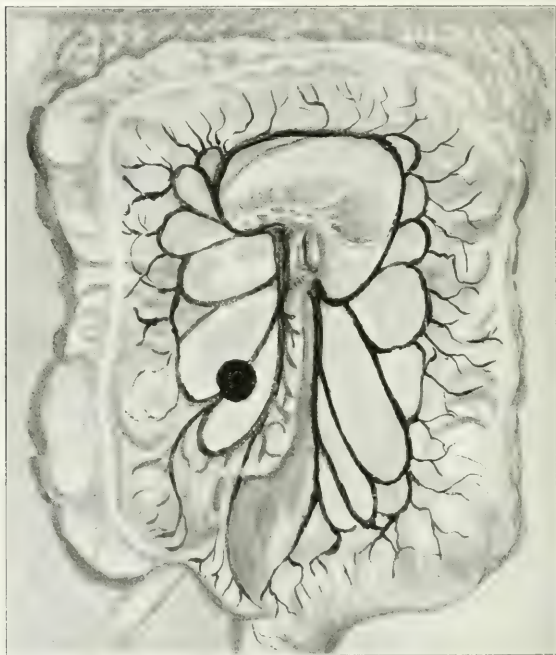


FIG. 1.—(After Moynahan.)

or flushing of cavity; only a few stitches were inserted to partially close the abdominal opening. This was followed by profuse bad smelling discharge for a week. The temperature became normal and the pulse fell to 84 the fourth day after the operation. Pain subsided; bowels moved naturally; and, apparently, a normal convalescence was in progress.

On the tenth day her condition was so favorable that a head rest was allowed for half an hour. The eleventh and twelfth days were

equally favorable. During the morning of the thirteenth day, about 1.00 A. M., patient awoke complaining of sharp shooting pains, nausea and faintness. The nurse changed the dressings at 5.00 A. M. and found them to be saturated with blood. Fresh dressings were applied five times during that day. The patient continued to complain of pain, nausea and faintness. I saw her with Dr. White the following day, the fourteenth, and her condition was alarming. The dressings were saturated with blood, and the open wound filled with large clots as though we were dealing with a ruptured ectopic gestation. The wound was cleaned and repacked, but the hemorrhage soon reappeared and the patient died that evening at five o'clock.

The nurse informed me later that a few hours before death, a little blood was found in the stool. We were totally in the dark as to a satisfactory explanation as to the cause and source of the hemorrhage. Nor did I feel at the time I saw her, that a secondary operation was advisable.

An autopsy was obtained and made by Dr. Tarvin in the presence of Dr. White and myself, the abdomen only being opened. The abscess cavity was well walled off and contained some blood. The appendix could not be found and had, apparently, sloughed away. Virgin uterus, tubes and ovaries, showed nothing abnormal. Small and large intestines, kidneys, spleen, stomach and liver were also found normal, with the exception of that part of small intestines adjacent to the abscess cavity, which were blood stained. The small intestines were removed and we found in the mesentery a gangrenous patch, the size of a dime piece, through which one of the branches of the ilioocolic artery coursed. Part of mesentery was also blood stained.

It is well known that in the appendiceal region both arteries and veins may be involved; that phlebitis and thrombosis, with their resultant septic embolism and metastatic abscesses, may occur. It is also reported that the iliac artery and vein are subject to erosion, with fatal hemorrhage.

19 WEST SEVENTH STREET.

DRAINAGE FOR PUS CONDITIONS IN THE PELVIS DURING PREGNANCY.*

BY

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THE most frequent cause of a pus accumulation in the pelvis during pregnancy must be attributed to a diseased appendix. In the chapter of appendix lesions, a pelvic abscess is most insidious, excepting perhaps the subphrenic abscess. The reason for this is that

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the diagnosis of appendicitis is often obscured by pregnancy. If the pains and frequent indispositions that usually accompany a pregnant state are not closely scrutinized, and correctly and promptly interpreted by the physician, the primary clinical picture of an attack of appendicitis may be readily overlooked, and only recognized when the more serious phases of the disease have manifested themselves.

Pregnancy does not in any way predispose to appendicitis. There is no doubt, however, that on account of the anatomical changes which take place in the pelvis during pregnancy, appendicitis may terminate in a pus formation more rapidly than in the nonpregnant state.

A close study of the symptoms of an appendix lesion during pregnancy may bring out some clinical points which differ from the usual clinical picture as is found in women who are not pregnant. For instance, before any pus formation has taken place, the pulse and temperature may show little or no change. The pain is usually located in the epigastric region, and remains there till the disease has reached a stage when all pain ceases.

The triad douloureuse of Dieulafoy, over the lower abdomen, is often so blurred by other conditions that it is usually obscured, and its presence is not recognized. Even in an advanced pregnancy, a readily recognizable rigidity of the right rectus is seldom encountered, and only exceptionally does palpation reveal a tender spot over McBurney's point. Nausea and vomiting, two alarming signs in an attack of appendicitis, count for naught during pregnancy; because both are frequently associated with the toxemia of the latter condition.

Palpation of an abdomen, after the fourth month of gestation, is very unsatisfactory, and it is seldom that any positive conclusions can be drawn from such an examination. Is it, therefore, at all surprising that appendicitis, in its primary stage during pregnancy, is apt to be overlooked? As previously stated, pregnancy favors the rapid development of the pathological stages of appendicitis, and a pus accumulation may be found in the pelvis in a surprisingly short time.

In one patient, pregnant five months, a distinct fluctuation could be detected in Douglas' pouch by rectal palpation on the fourth day after a severe attack of "indigestion." This patient only felt indisposed for two days. On the third day, however, she became very sick. No physician had been consulted before the third day. She said there had been no need for one.

Pus accumulations in the pelvis during pregnancy are favored by the location of the appendix and by the size of the uterus. The appendix that crosses the iliac vessels and hangs into the pelvis, the so-called "three o'clock" position, is the appendix that is a great contributing factor to a pelvic abscess; while a uterus beyond the third month of gestation, when it can be readily palpated through the abdominal wall, materially favors pus collections in the pelvis. This may be explained on the ground that the enlarged uterus, crowding into the abdominal cavity, exercises an undue influence upon the intraabdominal pressure above the pelvic plane, thus favoring fluids to collect in the pelvis. Furthermore, inasmuch as the formation of adhesions about the appendicial region is inhibited because of the rapidity with which the pus forms, the balance of the abdominal pressure usually remains undisturbed, and fluids will find their way along the route offering the least resistance.

Operative treatment of pus accumulations in the pelvis during pregnancy is a matter of great importance. The danger involves two lives, and prompt intervention is demanded as soon as a diagnosis has been reached.

The recognition of a pelvic abscess, especially when the accumulation of pus is small, is not always an easy matter. An examination of the lower abdomen is very often unsatisfactory on account of the large size of the uterus. A distention usually present and causing no pain, should, under all circumstances, strengthen any suspicion that might be entertained as to the possibility of a deeply seated abscess in the pelvis. The abdomen, on palpation, will not be found sufficiently rigid and tender to attribute this distention to peritonitis.

Palpation of the lower abdomen will, generally, disclose the iliac fossa free from a definite lump. However, there may be, in those cases where the uterus has ascended to a moderate degree into the abdomen (as in four- and five-month pregnancies), an obscure resistance above the pubes, formed by coils of intestine matted together above the abscess cavity. The percussion note over this obscure resistance gives a resonant sound, and deep percussion may elicit a tender spot over McBurney's point. Distentions of this character are generally caused mechanically by pressure of the abscess upon the rectum. As a consequence, the entire colon, and frequently the small intestine, becomes dilated.

Other valuable signs that aid in a diagnosis, are diarrhea of an intensely fetid odor, discharges of mucus from the rectum, rectal tenesmus, and often a feeling of discomfort in the lower part of the

rectum. These conditions may exist either in a mild or a severe degree.

The most satisfactory and most convincing evidence as to the presence of pus in the Douglas' pouch can be obtained by a rectal examination. If the accumulation is considerable, no difficulty should be experienced in promptly detecting a fluctuating mass, even if the examining finger is inexperienced. However, when the collection of pus is small, the examining finger must not only possess a delicate sense of touch, the examination is made without the rubber glove, but it must have been educated so as to recognize and differentiate any abnormal conditions in the lower part of the rectum.

A collection of pus in Douglas' pouch will impart to the examining finger, as it is introduced into the rectum a distance of 3 to 4 inches, a tender mass of variable size. This mass is sometimes hard and sometimes fluctuating. The mucous membrane of the rectum in the immediate vicinity of the abscess will be found swollen, edematous, and covered with mucus. Furthermore, through the sense of touch, the flattening of the rectum against the sacrum can be recognized.

In the treatment of a pelvic abscess complicating pregnancy, two factors become absolutely axiomatic: First, prompt recognition of the pus collection; second, the simplest surgical measure for relief.

Let us consider for a moment the first requisite. Why the prompt recognition of the pus collection? Any infectious process terminating in suppuration is one of the greatest dangers to a pregnant woman. On account of the continued high temperature, usually accompanying such a process, the life of the fetus becomes imperiled. According to statistics, a pus collection in the pelvis has caused abortion in 57 per cent. of cases, regardless of treatment. The abortions added 23 per cent. to the mortality of surgical intervention (Meyer).

Interruption of pregnancy may occur in three to five days after the pus formation has taken place. Advanced pregnancies are less tolerant of septic conditions than those of the early stages. Recently, I had occasion to observe a case that proved an exception.

A woman, in the sixth month of pregnancy, was taken with an attack of acute appendicitis. She was operated eight hours after the attack. It was a "clean case." However, the wound became infected. At time of operation, July 6, 1916, the temperature was 102° , pulse 124, R. 24. July 8, T. 103° , P. 132, R. 28. July 9, T. 104° , P. 130, R. 38. July 10, T. 104.4° , P. 132, R. 38. July 11, T. 101° , P. 124, R. 30. July 12, T. 100.2° , P. 112, R. 28. July 13, T. 98.8° , P. 104, R. 28. Labor pains from 12.05 P. M. to

12.45 P. M., at about five-minute intervals. July 14, T. 101.2°, P. 136, R. 36. July 15, T. 101°, P. 124, R. 32. July 16, T. 100.4°, P. 108, R. 28. July 17, normal. July 18, T. 102°, P. 106, R. 36. July 19, T. 103.4°, P. 104, R. 40. July 20, T. 101.2°, P. 98, R. 26. July 21, normal.

After that the temperature continued normal with slight variations. During the time of the high temperature, the movements of the fetus could be scarcely perceived by the mother. The heart sounds were heard with difficulty and sometimes not at all. This gave rise to fear of the death of the fetus. However, after the temperature had returned to normal, the movements of the fetus again became pronounced and the heart sounds could be auscultated with ease. In this case the fetus survived a high temperature, caused by a pus accumulation, covering a period of twelve days.

Now let us consider the second requisite: The simplest surgical measure for relief. First of all, let us bear in mind that although the abscess is not in itself the disease, it is nevertheless the factor of danger to the fetus, and must be urgently dealt with.

Surgery during the pregnant state must have its limitations, and these limitations must be more respected in the latter stage of gestation. An abdominal operation, for instance, can be performed with less risk of interrupting pregnancy before the fourth month than after this period of gestation. Furthermore, the thoroughness with which an operative measure, early in pregnancy, can be carried out is fraught with less danger than in the later stages of this condition.

The paramount principle in any operative work, at any period of gestation, is the measure that offers the greatest safety to mother and fetus; be it for a pus accumulation or any other condition.

A rather perplexing problem confronts the surgeon in the treatment of a pelvic abscess complicating pregnancy. His judgment tells him that urgent evacuation of the pus is demanded. His judgment also tells him that it must be done expeditiously and with the least amount of surgical meddling. To him it remains problematical whether or not his patient is going to abort or miscarry. He must be, however, prepared for such an emergency and conduct his surgical attack accordingly. Where is the section to be made?

If the case is one in the earlier stages of pregnancy and the section has been made through the abdominal wall and that the element of luck favors the procedure, recovery without interruption of pregnancy may result. This happy termination takes place in about 60 per cent. of the cases. According to the statistics of Myer,

abscess formation causes abortion in 57 per cent. of cases, regardless of treatment.

If the case is one in the later stages of pregnancy and an abdominal section is performed, the per cent. is less favorable. In these cases, an additional complication offers itself in the healing of the wound. Because of the constantly enlarging uterus, assuming that the patient has not miscarried, healing of the wound is considerably delayed; it may require from two to four months before the wound has fully and firmly closed. Should labor take place before the wound has firmly united, there is danger of hernia, or separation of the wound. If such a patient miscarries and lives, the wound will, of course, heal as under ordinary circumstances.

It has fallen to my lot to meet with two cases of pelvic abscess, in the sixth and seventh months of pregnancy, respectively. There was no difficulty in diagnosing the pus accumulation in Douglas' pouch, both by vaginal and rectal examination. The constitutional disturbance was marked. Both patients had been sick a week, and the prospect of a miscarriage in each case seemed good. Although the fetal movements were no longer perceived by the mothers, the fetal heart sounds could be auscultated, thus giving assurance of life in either instance.

The method of surgical procedure seemed at first to be a serious problem. After some little time deliberations crystallized themselves into simple measures. The temptation to make an abdominal section was lost when the complications that would inevitably follow such a measure at this period of pregnancy, were wholly realized.

A vaginal section, the logical procedure in the nonpregnant state, was dismissed because of the probability of a miscarriage. This is a hazard that must be reckoned with as the risk to the mother of a possible infection from the pus draining through the vaginal canal, in case miscarriage should follow vaginal section, would be very great. The only remaining avenue for consideration was the rectum, and it was into this viscus that the incision was made. Being certain of the pus accumulation in Douglas' pouch, it appeared to me to be the safer plan to drain through the rectum. The procedure proved very fortunate, both patients recovered without miscarriage.

It is of interest to cite some of the advantages of rectal drainage under these conditions. Assuming that a miscarriage had taken place, the danger of infection from pus could be readily controlled. Even had labor taken place before the abscess ceased to drain, the liability of infection from this source would be remote. The

abdominal wall is intact and well able to fully coöperate during labor. There is no wound to give anxiety. In from two to three weeks the abscess usually ceases to drain and the patient is well established in convalescence.

Rectal section for drainage of a pelvic abscess is in itself a minor procedure. It is the feeling of uncertainty of finding the pus, or of injuring a viscus, that causes one to hesitate. Especially is this true when the pus accumulation is small and when no distinct fluctuation can be elicited. Much of this, however, rests with the experience of the surgeon; one may feel certain, while another may be in doubt as to the presence of pus.

There still exists a great reluctance to attacking a pelvic abscess through the rectum, presumably because of the likelihood of infecting the abscess cavity with fecal matter. This, however, may be considered as doubtful, inasmuch as this avenue is one of Nature's outlets to relieve the organism of pus accumulation in the pelvis. Patients relieved in this manner have usually suffered no untoward results, and their recoveries have been satisfactory.

In making a rectal section the anus is first gently dilated. The rectum is then well douched. The index-finger, without glove, searches for the most fluctuating spot in the tense mass; when found, a sharp-pointed bistoury is passed along the volar surface of the finger and cautiously introduced into the spot selected. As soon as pus is encountered, the bistoury is withdrawn and the point of a dressing forceps introduced into the opening. By spreading its branches, a hole sufficiently large to admit the end of the index-finger is made. A large winged rubber tube is then passed into abscess cavity long enough for one end of it to protrude from the anus. This secures ample drainage and facilitates proper toilet. At the end of a week the tube is removed. The operation can be performed either without or with a superficial anesthetic.

DELMAR BUILDING.

REPORT OF A CASE OF RUPTURE OF THE UTERUS;
SEPSIS; OPERATION; RECOVERY.*

BY

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Cincinnati, Ohio.

RUPTURE of the uterus during labor is a rare and dangerous accident. Fortunately, it is so rare that only a very small per cent. of the men engaged in the practice of medicine ever see a case. The hemorrhage that occurs in rupture of the uterus, makes it a very fatal accident. Hemorrhage, however, is not the only danger in rupture of the uterus. This is demonstrated by the report of this case. The accident is of serious import, and it is worth while to report in detail every case. There will be no attempt made to review the literature of the subject, or to write a paper upon all its different phases. The writer will confine himself to the report of the facts observed, the condition found at the time of the operation, and the subsequent history of the case.

CASE.—Mrs. E., aged thirty, wife of a physician, Dry Ridge, Kentucky. The patient is the mother of three children, aged seven, three, and the third was born February 3, 1916, after a short, quick, unaided labor. There were no unusual symptoms after her delivery; in fact her husband, a physician, thought that she was fairly well until, in the afternoon of the fourth day, February 8, she had a slight chill. Her temperature, which heretofore fluctuated between 98.5 and 99° F., rapidly rose to 104°. The temperature subsided within two and one-half hours to 99°. After that the patient had, practically, a normal temperature every morning; between 2 P. M. and 4 P. M., the temperature varied, each day, from 101° to 102° until March 12.

During this period, the patient had a good appetite, felt well, had no chills or sweats, and had plenty of nourishment for her child. She complained because her doctor refused to let her get up; and expressed herself as feeling perfectly well, except for a slight pain or tenderness in the right lower half of the abdomen. This sensitiveness was always exaggerated in the afternoon during the rise in temperature.

The case was a puzzling one to her physician, a man of large experience in obstetrical work; he had never seen a case like it. The fact that there was no odor to the lochia or any other unusual condition, he felt reasonably certain that there could not be much wrong; still the case would not convalesce like other ordinary cases he had attended.

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In the afternoon of March 12, five weeks and three days after delivery, without appreciable cause the patient had a severe chill, lasting nearly an hour. Immediately after the temperature rose to 103.5° F. I saw her the first time four hours after the chill. The temperature had then fallen to 101° . Patient's abdomen was moderately distended, not at all sensitive to palpation, except in the right lower quadrant. This region was quite sensitive to pressure. Muscular rigidity was moderate on that side; no mass could be felt in the abdomen or pelvis, except an enlarged subinvolted uterus. The doctor assured me that there had not been anything unusual about the parturient tract since her delivery. Bimanual examination revealed that involution was progressing satisfactorily. There was nothing out of the usual to be found in the pelvis to account for the apparent sepsis. It did not seem to me the patient was suffering from puerperal sepsis. The cause of the infection was very problematical. Nor did it seem to be a case of appendicitis. The natural inference was that the patient had been the victim of a small ovarian cyst, which ruptured during labor, and nature was making an effort at cure by walling off the ruptured cyst. Still, a most careful examination did not reveal a mass of any kind. Therefore, I counseled delay and expectant treatment. The patient was in good physical condition, fairly comfortable and had plenty of nourishment for her baby.

The temperature rose each day to 101.5° to 102° , without chill, until the afternoon of the 16th, when the temperature went up to 103.5° . I was again asked to visit the patient. Notwithstanding the patient had been given an effective laxative each evening, the abdomen was fairly well distended. The uterus was as large as at my first visit, and not particularly tender. The pain and rigidity of the right half of the abdomen were more marked than before. Upon palpation I could outline an indistinct mass to the right of the uterus. This mass was not observed when I made my first examination. Six weeks had past since the patient's delivery. She was steadily growing worse. The mass in the right iliac region was probably pus. The patient was moved to the city March 20, thirty-five days after labor. On her arrival at the hospital her temperature was 102° . The following morning it had fallen to 98.6° . That afternoon, the temperature rose to 104° . The patient had a profuse sweat, and the mass in the abdomen appeared to be at least three times the size it was four days ago, and very much more sensitive to the touch. She had no longer any desire for food, and the pulse ranged from 90 to 110. She appeared septic; though she had still plenty of milk for the baby which continued to nurse.

On the afternoon of March 22, the abdomen was opened in the median line, under anesthesia. The omentum was found to be adherent to the abdominal wall and over the entire mass in the abdomen; it was also adherent to the fundus of the uterus. In separating the adhesions from the uterus, pus was found in front and to the right of the uterus. This abscess cavity held about 2 ounces of thick, yellow pus, and was carefully removed with gauze sponges.

It was now discovered that there had been a rupture of the uterus, at the fundus. The rupture extended down to the top of the bladder. In this rent the omentum has inserted itself and was firmly adherent to it. The uterus was larger on one side than on the other.

The omentum was severed, close to the uterus and all that portion of it in contact with the pus cavity, removed. The Fallopian tube on that side was not involved. The appendix was not involved. To protect the general peritoneal cavity, a strip of gauze was laid on the uterus over the site of the pus cavity and brought out through the lower end of the incision. A rubber drainage tube was left in the abdomen.

The patient rallied quickly from the anesthetic. How far the omentum extended into the uterus, whether it extended wholly or partially through the uterine wall, there was no means of determining. As nature had repaired the injury very satisfactorily, I considered it good surgery not to interfere with that organ at all. The infection was due to leakage from the uterine wound.

Studying the history of the case, we find that the first alarming symptoms were ushered in by the chill on February 8, at which time her temperature rose to 104° . The rapid subsidence of this high temperature, and the subsequent favorable progress of the case, does not indicate a streptococcic infection. One can thus readily see why the temperature and pulse and all the symptoms were of a milder character. It simulates somewhat the history of a ruptured appendix in which an abscess follows and is well walled off. One might infer that this form of unrecognized accident, plays an important rôle as a source of infection in some of the slow and tedious convalescences following labor. The writer is not in a position to prove this and does not wish to state that as a fact, but we all know that every obstetrician has had the experience of meeting cases of mild infection in which he is not able to trace its source; and this makes it worth while to consider this accident as a possible cause in such cases.

628 ELM STREET.

DISCUSSION.

DR. HENRY SCHWARZ, St. Louis, Missouri.—The case reported by Dr. Hall is indeed a remarkable one, and it was handled by him with consummate skill and good surgical judgment. As an obstetrician, I regret that he did not remove the uterus for the sake of having it examined as to the condition of its tissues. The case is very exceptional that a woman, who has a normal pelvis, who has given birth to three children without any difficulty, should have a rupture of the uterus at the time of labor. If she had a rupture, the presumption should have been that she had had removed from the uterine wall a fibroid, or that she had on a previous occasion, perhaps

for a pelvic tumor, a Cesarean section done upon her. At any rate, there should be some history to account for the cicatricial tissue or some weakening in the uterine wall. Without that history, and without the symptoms described in this case, it is not at all clear that we are dealing with the symptoms of a rupture of the uterus during delivery, and I would hesitate to accept Dr. Hall's case as one of rupture of the uterus having occurred at the time of delivery. I think it is a case that is altogether in a class by itself. Leaving aside cases in which the uterus ruptures after scar formation, a subject which will be discussed in papers to be read later in the session, rupture of the uterus is expected only when nature is hindered in her efforts to expel the fetus, when there is a disproportion between the parturient canal and the fetus. Under these circumstances it is good obstetrics either to do a Cesarean section for relative indications or to induce labor ahead of full-term. Of such cases I have seen only two, one before the time of doing Cesarean sections for relative indication in 1881. At that time we tried to induce labor in a case of minor pelvis. The nurses and junior assistants were sitting with the patient; labor was in full swing. The moaning of the patient was regular and kept me asleep in an adjoining room. But when everything was quiet in the delivery room I woke up and found the nurse and house resident asleep and the patient quiet. When there is a rupture of the uterus the patient becomes absolutely quiet. I ran into the delivery room and found that the child had escaped into the abdomen; I pulled it out by the feet, sent for my chief, who opened the abdomen, and closed the rent.

The second case occurred while I was delivering a lecture on obstetrics. A practitioner with whom I had had a number of cases of placenta previa, telephoned me in the morning that he had a case. I asked him if he had packed the case properly and he said he had. I told him that the patient could wait until I got through with my lecture. When I reached the house there was a rupture of the uterus. I found that the practitioner had given something which I did not advise, namely, a dose of Sharp and Dohme's ergotol, and the intense contractions caused the rupture of the uterus. The woman's vitality was very low and she died a few minutes after I had extracted the child, which had partially escaped into the abdomen.

DR. EDWARD J. ILL, Newark, New Jersey.—I disagree with my friend Dr. Hall as I do not think he had a rupture of the uterus in this case. Rupture of the uterus always occurs in the lower segment; it never occurs in the upper segment. Then he speaks of there being no blood in or about the abscess. There must have been some blood there if there had been a rupture, even if there was a secondary suppuration. Lastly, I have seen many cases of slow suppurative metritis following labor in which abscess occurred anterior to either horn and which, when opened and drained, was followed by recovery of the patient.

DR. J. HENRY CARSTENS, Detroit, Michigan.—Rupture of the uterus occurs usually in the manner Dr. Schwarz has mentioned. I am rather inclined to think that Dr. Hall's case was one of embolism.

of the uterus, where, on account of degenerative changes, the part dies slowly of gangrene and finally tears.

DR. ARTHUR J. SKEEL, Cleveland, Ohio.—I am much interested in Dr. Hall's paper as it illustrates a case I had some time ago.

Rupture of the uterus must necessarily belong to one of two categories. First, those cases in which there is disproportion and after a prolonged labor a thinning out of the lower uterine segment with rupture in this location. In the other set of cases, through degeneration of the uterine muscle, rupture may occur early in labor and may take place anywhere in the body of the uterus.

The case I wish to report occurred in a woman who had in rapid succession ten children, with no difficulty. In the eleventh labor, after some two or three hours of pains, rupture occurred with the head in the pelvic cavity. The patient was taken to the hospital, the child removed with low forceps. The woman was in extremis. The abdominal cavity was opened, and rupture found without any thinning out of the lower segment of the uterus, as it occurs in those cases where labor has been going on for a long time. The rupture took place on the right side from the anterior portion of the uterine wall near the horn down toward the base of the broad ligament. There was no thinning out of the uterine wall at all. The rent was sutured, and after a somewhat tedious convalescence the woman recovered. This illustrates very clearly two types of cases, one due to obstruction in which necessarily rupture occurs in the lower uterine segment because of the thinning-out process due to a prolonged labor, and the other due to a degeneration of the uterine muscle in which rupture may originally occur almost anywhere in the body of the uterus.

DR. SYLVESTER J. GOODMAN, Columbus, Ohio.—Presupposing that this was a case of rupture of the uterus, and in view of the fact that this condition is somewhat rare, I wish to put on record two cases of rupture of the uterus which occurred in our service at the Grant Hospital in the last few months.

The first case occurred in the service of Dr. Drury in which a diagnosis was not made until a week after the rupture had taken place. Infection had occurred, with general peritonitis and pus everywhere. The abdomen was opened by the doctor who found a dead macerated fetus, which was removed, a hysterectomy made, abdominovaginal drainage instituted, and the woman made a good recovery.

The other was a case in which the diagnosis was promptly made and occurred in the service of Dr. Baldwin, operation having been performed by him. The diagnosis was made promptly by the attending physician, who had the patient brought to the hospital; a hysterectomy was done, abdominovaginal drainage instituted, and the patient made an uneventful recovery.

I cannot believe with Dr. Hall that we have many cases of rupture of the uterus that go unrecognized. Men connected with gynecological services would certainly use their efforts to determine previous ruptures if such were the case. We know how rarely we see a con-

dition of that kind, notwithstanding the fact that we operate on hundreds of cases. Personally, if I had had such a case I surely would have made a hysterectomy.

DR. O. H. ELBRECHT, St. Louis, Mo.—The case reported by Dr. Hall is so unusual that I feel with several of the previous speakers that it belongs in a class by itself. The thought occurred to me that this might have been either a bicornate uterus or a double uterus. If you recall the different types of bicornate uteri and the different types of double uteri, occasionally you will see one that is open and very thin, and there is a disproportion between one uterus and the other, one being parasite to the other, the tubes and ovaries being two in number only. There is a possibility of this case having been one of that type, inasmuch as it did not present any of the classical symptoms which we find in typical cases of rupture of the uterus.

It is to be regretted that Dr. Hall could not do a hysterectomy, as this would have cleared the pathological problem.

DR. HALL.—I have a live patient now, but she would have been dead if I had done a hysterectomy.

DR. ELBRECHT.—I refer only to the pathological side of it. I agree with you clinically and am sure you displayed excellent judgment in leaving it.

The pathological conditions, when you are in the belly, are so seriously distorted by the inflammatory products that you must guess at it and you did just what any of us would have done under similar circumstances. But the point is this: why should this case be in a class by itself and still be a rupture of the uterus, with so little disturbance that you chose to call it a normal delivery?

DR. JAMES E. DAVIS, Detroit, Michigan.—I wish to call attention to a condition that has not been mentioned in connection with this paper. Perhaps it might be considered in connection with Dr. Hall's case. Cullen some years ago reported upward of 150 cases of cysts occurring from the Wolffian duct remains between the anterior part of the uterus and the bladder. Last year I had such a case. The cyst had become infected, and in fact most of these cysts do become infected and are recognized following obstetrical deliveries. In my case the woman manifested a septic temperature, beginning on the fourth day which continued for eight weeks. When she came to operation, and an abdominal section was done, nothing was found to account for the conditions until I began to separate the bladder from the anterior portion of the uterus, then I opened into a cystic cavity which was infected, and which I diagnosed as belonging to this type of cysts. I wondered whether Dr. Hall's case might not have belonged to this class of infections?

DR. GEORGE VAN AMBER BROWN, Detroit, Michigan.—Four years ago I had a case of rupture of the uterus, a recital of which may be helpful in arriving at the cause of this trouble. The woman had previously borne two children. This was her third pregnancy. She had a normal delivery. A few hours after her delivery her physician was called, and as they could not get him, they called in a neigh-

boring physician, and we do not know at that time what he did except the vagina had been packed. The woman was taken to the hospital; she remained there for ten or twelve days, apparently was doing very well, and then went to her home. She had been home only a day, was up and about, when profuse hemorrhages came on again. She was again taken to the hospital; I was out of the city at the time but was called a few days later to see her in the fourth week after her delivery. She had no chills, nor rise in temperature; the only symptom was that of bleeding. At the time I saw her anemia was very pronounced; she had shortness of breath; her legs were edematous; her labia were like two great sacs holding water. Her hemoglobin was so low that we could not make an estimate of it. It showed 20. The blood count was 1,435,000. We took her to the operating room; we did not dare give her a general anesthetic. We put her in the Trendelenberg position, opened the abdomen under novocain, and found the omentum which had just closed in over and was appearing at the fundus; we pulled that away, and found there was a cavity where the blood was arrested. The edges of the wound had shown no signs of healing whatever, but were very much narrowed down. Involution had gone on very well. The woman made a nice recovery.

In getting hold of the young physician who had been called in at the time of the first hemorrhage, it was found that he had packed the uterus as well as the vagina. Evidently that was the cause of the rupture and it did not occur at the time we supposed it did.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—The case reported by Dr. Hall is, certainly very interesting and deserves consideration. The history of the case was not quite clear to me. Will Dr. Hall kindly state the nature of the case. Did she have an instrumental delivery, a version or any other obstetric intervention?

DR. HALL.—It was not an instrumental delivery. I did not go into the other details. The patient was a doctor's wife, delivered her after a short and uneventful labor. She had a few effective pains only. She lost consciousness for five or ten minutes; her husband thought she had fainted. The patient was a highly nervous woman, and did not recover consciousness for four or five hours.

DR. SCHWARZ.—When was the placenta removed?

DR. HALL.—The practitioner removed the placenta from below.

DR. ZINKE (resuming).—She had then a spontaneous labor and the doctor only assisted in the delivery of the placenta?

DR. HALL.—Yes.

DR. ZINKE.—There is no history of injury to the uterus, and if a rupture did take place it was, probably, spontaneous and due to some diseased or abnormal condition in the uterine wall. Now, what is it that can disturb the uterine wall and result in a rupture of the uterus during delivery? None of the conditions that might be responsible for the accident have been mentioned except one. Is it not possible that this placenta in some small part had undergone chorionic epitheliomatous degeneration and that the portion

involved had destroyed the uterine musculature in that region. We can never tell when these malignant changes develop. They may begin at any period of gestation. At the time of labor the placenta had perforated the uterine wall. Infection may have resulted in an abscess which broke through the peritoneum, and caused adhesion between uterus and omentum. In this way we can, in a manner at least, explain the conditions described by Dr. Hall. This is about the only explanation I have to offer. It was not a rupture which occurred during the labor; nor was labor itself responsible for it. Evidently the perforation occurred some-time after the birth of the child. The case is explicable only when placed on the basis of a pathological condition.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I quite agree with Dr. Zinke that this case must have been one of perforation rather than a rupture of the uterus, and the contribution I have to make on the theory of how perforation occurs is this: the observation that I am going to make and tell you about was on a dog instead of a human being, but I think it may have some bearing on this case.

A year or two ago I had a French bull bitch which against my wishes became pregnant, and after she had been pregnant for some weeks some one stole her and she was gone four or five days. Finally, one Sunday, when I got home my bitch was there and showed great evidences of abuse. She evidently had been tied up as there were scratches all over her. I wanted to keep this bitch and did not want any puppies. The next time I went out of town a professional friend of mine did a hysterectomy on her. He reported to me this very unusual condition, that in one side of the uterus there were three perforations. The dog was quite sick. These perforations were round and covered by omentum. My idea is that the dog was kicked in the belly or had received some violence which set up a thrombosis in the uterus and it went on to perforation. It was necessary to do a panhysterectomy and the dog recovered from the operation. It seems to me, this case may have some bearing on the case cited by Dr. Hall. This woman might have sustained some injury to the uterus through the abdominal wall which may have caused a limited thrombosis.

DR. HALL (closing).—I did not expect very many obstetricians to agree with my diagnosis in this case of rupture of the uterus. I have opened a great many abdomens, and the old story that he who laughs last laughs best holds good in this case. There would not have been a question in your mind if you could have seen the uterus at the time of the operation as to whether there had been thrombosis with incarceration of the omentum or a rupture of the uterus. I am willing to accept the end result that the patient recovered on the theory that she had a rupture of the uterus. That may be all wrong, and I am perfectly willing to stand corrected if it is. For the sake of argument, let us admit it was a thrombosis. It looked as though the uterus was split in two and the omentum dropped in and was carried into that organ, and some of the dirt, walled off, as the cause of the abscess. That is only theory on my part. It

was the most reasonable thing to me, yet it may have been a thrombosis, with breaking down later and the omentum being caught in the uterus. The omentum was not plastered on to the uterus, but it was incarcerated in the uterine wall. I first examined on one side to detach it, and then on the other.

The less surgery we do on a patient who is profoundly septic the better the end results. I think the explanation of Dr. Davis would be more rational than the theory of thrombosis of the uterus, namely, an abnormal cystic development in the uterus which caused a weak point. After all, it is largely theoretical. It may be she did not have a rupture of the uterus, but a case of secondary infection from a thrombosis.

In regard to the question of Dr. Schwarz as to whether the husband introduced his hand into the uterus, I will say that the husband said he had no difficulty in removing the placenta. That is about the only question I asked him. Rupture of the uterus never entered my mind as a causative factor until the time of the operation. In short, rupture of the uterus was not discussed before operation.

DR. ELBRECHT.—How about perforation before she became pregnant?

DR. HALL.—I do not think she had a perforation before she became pregnant. She was the wife of a physician and very anxious to have a child. Everything was lovely so far as their domestic relations were concerned.

DR. PANTZER.—Had she ever been curetted?

DR. HALL.—No, she had not.

RUPTURE OF THE UTERUS IN CESAREANIZED WOMEN, WITH A REVIEW OF THE LITERA- TURE ON THIS SUBJECT TO DATE.*

BY

JOHN NORVAL BELL, M. D., F. A. C. S.

Detroit, Mich.

A CASE of this character, occurring in my practice recently, led me to inquire into the frequency and causative factors of this accident. From the literature available in the library of the Wayne County Medical Society and the Medical Library of the University of Michigan, I have been able to find seventy-eight cases recorded, my own case making seventy-nine. This includes the sixty-three cases tabulated in the very exhaustive paper on this subject, in the American Journal of Obstetrics, by our esteemed Fellow, Dr. Palmer Findley. In order to have as much as possible of the literature on the subject available in one place, I have compiled a

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

review of forty-two cases more or less in detail, which I would be pleased to furnish on request.

In endeavoring to determine the frequency of this accident, we find that sixteen of these cases occurred prior to the year 1900 and twenty-six since that time. Considering, therefore, the number of abdominal Cesarean sections that have been done all over the world, especially in the last decade, we may safely conclude that this accident is comparatively rare; that its rarity speaks well for the improvement in technic in the operation in recent years; and that the possibility of rupture in subsequent pregnancies should not, we think, be considered as a contraindication where the operation is clearly advisable.

Suture Material Used.—In seventeen cases catgut was used, in two silk, in one silk and catgut. In the remaining twenty-two cases, the kind of suture material (when such was used) is not mentioned. In many of the earlier cases reported, the uterus was not sutured, the abdominal incision being closed with a few sutures, presumably silk.

Mortality.—Twenty-seven of the mothers recovered, while only four of the babes were born alive, giving us a mortality of 60 per cent. and 90 per cent. respectively. Twins were present in one of the cases. The high infant mortality is, undoubtedly, due to the loss of blood incident to the rupture, delay in operating, and prematurity of birth.

Etiology.—When we consider the causative factors in the production of this accident, we can, with a reasonable degree of certainty, conclude that the uterine wall at the site of the scar was defective. This is shown by a review of the cases reported; rupture invariably occurred at that point. Undue tension may be produced by a large fetus, pregnancy or hydramnios.

The most important factor, however, is the condition of the scar in the uterine wall. In but few if the cases reported have microscopic examinations of the ruptured scar edges been made; and this, I confess, was neglected in my own case. Considerable light is thrown on this phase of the subject by the microscopic findings in the case reported by Cocq.

In the case reported by Breitenbach the microscopic findings would seem to indicate that the placenta had been attached to the scar area; in two of the three cases reported by Wall and Shaw this same condition was found.

Further evidence that the faulty scar is the principal cause in the production of rupture, is found especially in the cases reported by Sommer, Convelair, Locher, Brunnings and myself. There can be

little doubt that infection following the operation predisposes to rupture in subsequent pregnancies; attachment of the placenta over the site of the scar has a tendency to render the uterine wall more soft, easy of distention and hence more liable to rupture at that point. This latter is further verified by Palmer Findley in his recent article on the subject. He found that in eighteen out of twenty ruptured uteri, the placenta was attached to the scar area.

It is interesting to note that the great majority of the ruptures occurred during the pregnancy following the section and the sooner the pregnancy occurred after the operation the greater the liability to rupture.

It would seem also, from a review of the literature, that the rupture takes place in the vast majority of cases *in* the scar and not in the musculature near it. An exception to this is noted in the cases of Davis reported by Harrar, who says that microscopic examination showed the rupture to have taken place in apparently healthy muscle tissue, but between two old section scars.

It has occurred to the writer that, in the cases where chromic catgut is used, a faulty scar may result even where no infection existed, because of the destruction of more or less muscular tissue by the formation, around the sutures, of small canals containing a serosanguinous fluid, such as is sometimes observed in the abdominal wall. It is very probable that the intermittent contraction of the uterus, during the first thirty-six hours postpartum, also tends to interfere with a proper healing of the incision. Especially would this seem to be true when we consider the irregular course of the muscle fibers in the uterus. Healing may also be more or less retarded because of the impoverished condition of the blood consequent upon severe hemorrhages. My own case was as follows:

March 19, 1914, Mrs. K; aged twenty-seven; primipara; justo-minor pelvis; membranes had ruptured before entering the hospital.

Thirty-six hours after admission convulsions developed. Patient was promptly anesthetized and delivered by abdominal Cesarean section. The convulsive seizures recurred postpartum and venesection was twice resorted to, 1400 c.c. being removed the first time, and 1200 c.c. seven hours later.

The third day after labor she developed a temperature; this continued for almost two weeks, fluctuating between 100.2° and 103.8°F., but, eventually, she made a good recovery.

On October 16, 1915, when within about three weeks of term with her second pregnancy, she was seized suddenly with severe pain in the abdomen about 12 noon. Rest in bed and some household reme-

dies administered for the pain, did not improve her condition, and I was called at 1:30 P. M.

Upon my arrival at the house her condition was one of shock, apparently due to internal hemorrhage, although her pulse was still of fairly good quality. The ambulance was ordered. I went to the hospital to prepare for operation. When the ambulance arrived at the patient's house, she had improved so much that the husband would not allow her to be taken to the hospital. Here valuable time was lost. It was 4 P. M. before the operation was performed.

On opening the abdomen, the placenta and dead child were found among the intestines and promptly removed. A few dark clots, but very little fresh blood, was found. The uterus had ruptured through the Cesarean uterine scar and contracted firmly so that there was, practically, no bleeding.

Supravaginal hysterectomy was performed, and we looked for a prompt recovery; but the patient did not rally well from the operation and died at 9:15 that night.

On subsequent examination of the uterus, I was surprised at the thickness of the uterine wall where the rupture had occurred. This is, I think, explained by the microscopic and macroscopic findings in Cocq's case to which reference has been made to. As the placenta was lying completely in the abdominal cavity, I am inclined to believe it had been attached to the scar area.

From the foregoing evidence, it would seem that, if any improvement in our method of closing the uterus is to be made, it should be in the more careful closure of the uterine incision. We should always endeavor to secure a perfect approximation of the uterine musculature without including the mucosa. It has long been understood that care must be exercised in closing the uterine incision, the mucosa should never be included in the sutures because, in a subsequent pregnancy, islands of the mucosa may be transformed into decidual tissue and thus weaken the uterine wall. This we consider an excellent point.

The ten-day chromic catgut, number 3 is, we think, the best material and size for the deep sutures. Plain catgut may absorb more readily and cause less weakening of the walls through formation of canaliculi.

CONCLUSIONS.

1. A Cesareanized woman is always in danger of rupture of the uterus in subsequent pregnancies and should, therefore, be under careful observation during the latter months of the period of gestation.

2. If the puerperium following the first Cesarean section was afebrile, the patient may be permitted to go to term with the next child provided she can spend the last month of gestation in the hospital; if not, labor should be anticipated at least two weeks prior to term.

3. Implantation of the placenta over the scar area, undoubtedly, increases the danger of rupture of the uterus in a subsequent preg-

nancy; the same may be said of a febrile puerperium following hysterotomy.

In closing, I wish to acknowledge the valuable assistance given me by Dr. C. V. Weller in reviewing the literature.

1149 DAVID WHITNEY BUILDING.

RUPTURE OF THE CESAREAN SCAR.*

BY

A. J. RONGY, M. D., F. A. C. S.

New York.

THE introduction of asepsis and antisepsis in the practice of surgery and the application of these principles to obstetric surgery created a new problem for the obstetrician.

The abdominal method of delivery, once a rare and most feared operation, was very soon applied not only in cases in which absolute contraction of the pelvis existed when the delivery of a viable child was impossible, but also in cases of relative disproportion of fetal head to the pelvis.

Of late Cesarean section is being adopted as the safest method of delivery for the mother in some forms of placenta previa and eclampsia. The operation, which originally was almost always performed in the interest of the child, is now extended to many cases where it is thought the interest of the mother is best conserved.

This broader application of the operation created a new problem in obstetrics, "the care of the Cesareanized woman during subsequent pregnancies." Every obstetrician is confronted with this problem. He must definitely decide as to the proper procedure in such cases. A thorough perusal of the literature discloses the fact that very little thought has been given to this most interesting condition, and that the subject has been hardly investigated. We, therefore, lack the necessary experience upon which to base our opinions and conclusions. The delivery of a child by the abdominal route is now estimated to take place in about one out of two hundred pregnancies. If this is true, we can readily realize the magnitude of this question and how important this discussion is. This problem must not only be approached from its surgical aspect, but also from the standpoint of the patient.

In metropolitan districts the interest of these patients is, to a certain extent, safeguarded by virtue of the fact that competent help is within very easy reach; however, very many of these women are so situated that proper surgical aid cannot promptly be rendered

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should a complication arise during pregnancy or labor. How shall we conserve the interest of such patients?

Shall we, when advising a patient to undergo a Cesarean section, discuss the immediate results of the operation only? Or are we to enter into the question of subsequent pregnancies and their management? I believe the patient has the inherent right to be made acquainted with all the facts, present and future, connected with this operation.

What shall be the attitude of the obstetrician? Shall he treat the case in accordance with present indications and entirely eliminate the question of subsequent pregnancies from consideration, or shall he put forth the dictum "once a Cesarean, always a Cesarean?" It is this thought in my mind that prompted me to bring this question to your attention. I earnestly hope that your discussion will help to settle this difficult and most recent obstetrical problem.

As far back as 1886 Krukenberg saw fit to undertake an exhaustive study of rupture of the Cesarean scar. He collected twenty cases from the literature which showed a mortality of 50 per cent. He believed two factors to be responsible for the rupture of the scar: First, the natural weakness of the cicatrix in the uterus. Second, invasion of the musculature of the uterus by foci of decidual cells. He believed that if silk were used in suturing the uterine wound, rupture would seldom, if ever, occur. This contention was soon disproved for, in the cases of Wager and Everke, rupture occurred notwithstanding the silk sutures.

Recently N. R. Mason and J. I. Williams investigated the strength of the Cesarean scar by animal experimentation in guinea-pigs and cats. They tested the comparative strength of the muscle and scar of the uterus by applying weights to a section of the uterine wall containing the scar. They found that in each instance the muscle gave way first. In one case only had the rupture extended into and along the scar. In another it passed through the scar at right angle to it. Two animals were again pregnant and near term when the tests were made with the same results. They thus ruled out any change in the strength of the scar during pregnancy and concluded that a firmly united scar is even stronger than the uterine muscle.

Harrar cites forty-two cases in which repeated section was performed, and the previous scar was either not discernible or was solid with no apparent thinning or stretching. He further states that in sixteen out of forty-two cases there were adhesions of the omentum either to the uterus or to the anterior abdominal wall. He

maintains that these adhesions did not seem to affect the uterine cicatrix.

Personal experience, based on observation of the uterine scar during the performance of repeated section, compels me to differ from the above conclusions. It is hardly possible to maintain that a scar in any part of the body, even if its healing processes were normal, possesses the same strength and vitality as normal tissue. Healing by first intention has its definite inflammatory reaction and, therefore, no scar can possess the same anatomical and physiological characteristics as normal uninjured tissue. Its nutritive powers must be lessened. It is subject to many local disturbances. Its natural life is shorter, as is evidenced by the thinning out of many cicatrices in the abdominal wall of wounds that healed by first intention. The healing process of a uterine wound is unlike that of any other surgical wound in the body. There are many factors which interfere with perfect union; the intermittent contraction of the uterus, and the retained secretion in the uterine cavity tend to disturb the union of the wound. During a subsequent pregnancy the normal growth of the uterus, the waves of contractions which constantly take place during the latter months of pregnancy, and the not infrequent implantation of the placenta, wholly or partly, in the scar area and the trophic changes of the uterus, all cause alteration in the scar tissue, thereby lessening its resistance to any undue strain either during pregnancy or labor. Assuming that the experiments of Mason and Williams are clinically true of all the cicatrices which result from primary union, I scarcely believe that the authors would maintain that cicatrices, the healing process of which is disturbed by infection, possess the same strength. Clinically, there are evidences of infection in and about the uterine scar in at least one-third of patients who are operated for repeated section. This fact is very plainly demonstrated by the signs of degeneration in the scar structure and omental adhesions in and about the cicatrix observed during subsequent operation. Unfortunately, we have no means at our disposal by which we are able to diagnosticate the actual changes which take place in the uterine wound. The infection is very often so insidious and mild that it causes very little, if any, constitutional disturbances. Nevertheless, the local changes in the wound do interfere with the normal regenerative processes.

The laws governing the formation of the Cesarean scar differ in all their essentials from all other scar formation; therefore, in order to safeguard the interest of the woman who has had a Cesarean section performed, we must definitely decide what method of treatment

shall be pursued in the event of subsequent pregnancy. The conclusions of early writers like Lucas Championniere, Säger, and Leopold, that the strength of the scar depends entirely upon the degree of asepsis and antiseptis practiced, on the use of proper suturing material, and the careful approximation of the united ends cannot, in the light of our present knowledge, be accepted as the only causes for scar weakness and subsequent rupture. Recently cases of rupture were reported from some of the best and most modern clinics, both here and abroad. The technic followed is practically the same in all cases, yet rupture will very often occur before labor actually sets in.

Louis Singer (Paris, Thesis, 1908-09, No. 449) undertook to investigate the frequency of rupture of the Cesarean scar. He made an exhaustive study of the literature and also communicated with the surgeons in charge of the cases. His report is based on 155 published and 98 unpublished cases, or 253 women who had 290 gestations and were delivered by section. In this series rupture of the scar occurred in twenty-one cases. He states that this unusually large per cent. of rupture was due to the improper technic of the earlier operators. He, therefore, continued his investigations to more recent times and collected ninety-eight cases who had 113 gestations, and who were delivered by Cesarean section with no subsequent disturbance of the scar.

Judging from various reports, most authors agree that rupture of the scar occurs in about 3 per cent. of cases, and that the mortality in such cases is over 50 per cent., no matter how promptly treatment is instituted. Therefore, nearly 2 per cent. of women who have had a Cesarean section performed, ultimately perish as a result of the operation.

This accident is entirely dismissed from consideration in the various mortality records of the Cesarean operation. In order to have such records complete, the indirect mortality, such as is caused by secondary rupture and the rarer complication of bowel obstruction, must also be included.

We all realize that the primary mortality from Cesarean section is still high, that the mortality would be greatly reduced if it were possible to operate on all cases before exhaustion and infection have already set in. It is the lack of diagnostic ability that increases the mortality in all surgical operations; particularly is this true in obstetrics. Elective surgery now has a very small mortality. There is no reason why we should not educate ourselves, as well as the profession at large, whereby a proper diagnosis can be made early

enough to make the surgical procedure one of election, and not of emergency, as is unfortunately the case in the greatest per cent. of cases. The mortality of elective Cesarean section is at present only about 3 per cent. Rupture of the Cesarean scar occurs, at least, in about 3 per cent. of cases. Theoretically, it would appear that it should be logical to conclude that the dictum, "Once a Cesarean, always a Cesarean," is correct and should be accepted as the standard of practice. The patient who once has an abdominal section is more careful about her condition and, owing to her previous experience, she usually places herself in the care of a competent surgeon. She is watched carefully. She does not question the advice given to her as to the management of her condition. In that way she gains all the benefits which modern obstetrics offers, so that the mortality in repeated elective Cesarean section is practically reduced to a minimum.

I believe that in the very near future it will be proven that the mortality of cases of repeated Cesarean section will hardly compare with the mortality of cases of primary Cesarean section. However, at present these cases are still too few to permit of final deductions.

No matter how correct our decision may be from a theoretical consideration of the subject, or how sound our advice may be from a purely statistical analysis of the condition confronting us, we cannot always carry it out in actual practice. Various circumstances arise which compel us to modify our opinions. Very often we are in doubt as to the proper procedure in a given case. This is particularly true in cases in which labor appears to progress favorably and is expected to be of short duration. To this group of cases belong all patients who have had Cesarean section performed for conditions other than mechanical obstruction due to disproportion between the fetal head and pelvis, as cases of placenta previa, eclampsia and those who have had hysterotomy performed for tumors or adherent placenta. This class of patients reject any suggestion on the part of the obstetrician for any abdominal operation. They think their present labor different and one which to their minds apparently presents no complication. They, unlike the patients who have had dystocia, due to disproportion between the fetal head and pelvis, have experienced no pain during the birth of the previous child and are, therefore, not convinced of the necessity of interference. They as well as the other members of the family have a decided preference for allowing labor to take its natural course. Such patients really tax the ingenuity and the resources of the obstetrician. He is thus compelled in practice to deliver a number of

Cesareanized women by conservative methods not infrequently with disastrous results to both mother and child.

A certain amount of study and investigation has been accorded to rupture of the Cesarean scar during labor and we, therefore, have been taught to watch these patients while labor is progressing. The scar should be carefully watched for any thinning by often repeated abdominal palpation. These patients should not be permitted to pass through a stormy and prolonged labor. Interference should be instituted as soon as any signs or symptoms of impending rupture manifest themselves.

Spontaneous rupture of the scar during pregnancy, especially during the last two months, occurs more frequently than is generally supposed and, therefore, a woman who has been delivered by Cesarean section should be under strict observation during the latter half of the pregnancy. At times, thinning of the scar may be detected early, so that a proper measures to prevent rupture may be applied.

My experience consists of two cases of spontaneous rupture of the uterine scar during pregnancy, and one of threatened rupture during labor.

CASE I.—F. L', patient of Dr. S. J. Scadron, aged twenty-two, para-ii. First child delivered by Cesarean section in one of our large hospitals. Postpartum period normal, remained in hospital eighteen days. Pregnant again January 11, 1913. Was due September 20. Was carefully watched by Dr. Scadron. She was told that induction of labor might be considered about the thirty-sixth week. On July 24 the doctor was summoned to see her. On arrival he found the patient in shock. He made a tentative diagnosis of internal concealed hemorrhage and sent her to the Jewish Maternity Hospital. On admission, it became evident that the fetus was in the free abdominal cavity. She was immediately prepared for operation. On opening the abdomen the fetus was found to have escaped from the uterus through the old scar which gave way entirely. The placenta was in the opening, partly in the uterus, and partly in the abdomen. The patient was in severe shock. Suturing of the rupture was substituted for the more radical operation of hysterectomy. The patient died on the fourth day from septic peritonitis.

CASE II.—Mrs. R. W., aged twenty-eight, para-ii. First baby delivered by Cesarean section performed by Dr. Scadron two years ago. Became pregnant again one year later. July 11, 1916, about 3 A.M., the doctor was summoned to see her, because she did not feel well. On examination the abdomen was found to be distended, very tender and sensitive. The patient presented all the symptoms of shock. The diagnosis of rupture of the uterus was made by Dr. Scadron, who asked me to see the patient with him. The diagnosis was unquestionably correct, and she was taken to the Lebanon

Hospital for immediate operation. On opening the abdomen the placenta was presenting through the opening of the ruptured scar. The placenta and dead fetus were delivered through the opening and the uterus amputated at the internal os. The patient rallied and made an uneventful recovery. She was discharged at the end of sixteen days.

CASE III.—A. S., para-iii. First labor instrumental; baby still-born. Two year later she was delivered by Cesarean section by a well-known obstetrician. Sept. 12, 1913, she was admitted to the Jewish Maternity Hospital in labor. On examination the cervix



FIG 1.—Rupture of uterine scar.

was found dilated admitting two fingers, patient having strong pains every six to seven minutes. Membranes intact; abdominal palpation disclosed a deep notch in the anterior surface of the uterus corresponding to the line of the Cesarean scar. The findings were telephoned to me. I ordered immediate preparation for operation. My associate, Dr. S. J. Scadron, who arrived at the hospital first, fearing that rupture of the uterus was imminent, put the patient under light anesthesia during the preparation of the operating room. On opening the abdomen the uterine scar was found thinned out as if ready to rupture. The entire scar consisted of the peritoneal covering of the uterus and some strands of tissue underneath it. The uterus was incised through the old scar, which was resected completely. The wound was closed in the usual manner. Patient was discharged from the hospital on seventeenth day.

CONCLUSIONS.

1. Spontaneous rupture of the Cesarean scar occurs in about 3 per cent. of cases. In most instances rupture takes place during labor. It does take place not infrequently during the latter half of pregnancy, especially in the last six weeks.

2. We have no means by which we can judge the strength of the scar. Rupture will occur in cases which run an afebrile course and in which union of the wound is apparently by first intention.

3. One-third of all patients who undergo subsequent Cesarean section show evidence of inflammatory reaction in and about the uterine wound. The result in such cases is a weakened scar.

4. Proper suturing of the uterine wound and exact approximation of the edges will not always prevent subsequent rupture of the scar.

5. The mortality rate of repeated section is smaller than that of primary Cesarean section, because these patients are more carefully watched.

6. A patient who has once had a Cesarean section should not be allowed to go through a tedious or severe labor. If labor does not progress rapidly, Cesarean section should be performed.

7. When advising a patient to have a Cesarean section, the management of subsequent pregnancies should be taken into consideration and discussed with one of the members of the family.

8. As a general rule, it may be stated that fully 75 per cent. of women who have had a Cesarean section are delivered by repeated section during their subsequent labors.

9. The obstetrician should always bear in mind that Cesarean section creates a new problem for the woman, and therefore he should carefully weigh the indications before he decides upon the abdominal route. He should remember that the dictum, "Once a Cesarean, always a Cesarean," holds true in fully 75 per cent. of cases.

Finally, it is my firm belief that Cesarean section is very frequently resorted to in cases which should be delivered by other methods. Abdominal section is a major obstetrical operation. Surgeons and gynecologists, who have no obstetrical knowledge, are not competent to make a proper diagnosis and should not perform it. Obstetrics, in order to gain the respect of both the community and the medical profession, should be practised only by those who have had a proper training. The interest of the pregnant woman will then be properly safeguarded.

62 WEST EIGHTY-NINTH STREET.

DISCUSSION OF PAPERS BY DRS. BELL AND RONGY.

DR. PALMER FINDLEY, Omaha.—We have had two very interesting and instructive papers on a subject which has interested me very much of late. My interest in the subject was awakened by a case which I saw in the Charité Hospital of Berlin shortly before the war began.

A woman, twenty-three years of age, who had been Cesareanized eighteen months before for a contracted pelvis was pregnant in the seventh month of gestation and was losing a moderate amount of blood from a marginal placenta previa. She bore a wide abdominal scar which suggested probable infection following the Cesarean section. Prof. Franz, in charge of the clinic, directed that a bag should be inserted into the cervix and after dilatation of the cervix by the bag, that the head of the child should be perforated and the child extracted. The bag was inserted, pituitrin was administered and with the second pain the patient went into collapse. The abdomen was opened within twenty minutes and the uterus removed. There was found a complete rupture of the uterus and a dead fetus within the free peritoneal cavity. The patient died in collapse two hours later.

The following day Prof. Franz commented upon the case in his clinic and said, that henceforth he would always make his incisions high in the body of the uterus where the musculature is best developed and he would advise a Cesarean section on every pregnant woman who bore a Cesarean scar. Not long after this experience in Berlin, I had observations in three cases in Glasgow which called for a similar expression from Prof. Jardine and Prof. Cameron.

I found much the same sentiment in England and in the United States and I was inclined to adopt the slogan—"Once a Cesarean, always a Cesarean." However, a careful review of the literature has convinced me of the unreasonableness of such a conclusion.

I fail to agree with Dr. Rongy in his conclusions. I do not think any 3 per cent. should lead us to adopt a general course of action. I would rather be guided by the other 97 per cent. If as Dr. Rongy says, only 3 per cent. rupture in subsequent pregnancies would it not be more rational to pursue the policy of watchful waiting; to place all such cases in the hospital and allow them to deliver themselves if this can be done without serious embarrassment. If, on the other hand, there is a history of the patient having run a fever course after her previous section, or if there exists an evident cause for prolonged and difficult labor, such as a contracted pelvis, a malposition of the fetus or delayed labor from any cause whatsoever, then proceed with Cesarean section.

I would not favor high forceps, version, pituitrin or hydrostatic bags in the presence of a Cesarean scar. The uterine scar is always an unknown factor and as such we must avoid undue strain upon it. I would therefore conclude that once a Cesarean section always a hospital case in event of a subsequent labor.

DR. J. HENRY CARSTENS, Detroit, Michigan.—As I see it, this question is a rather difficult one to solve, and I agree in the main

with what Dr. Findley has said. I do not know how many cases I have had, but I should say fifteen where I have performed Cesarean section a second time, and in one or two instances I have performed it a third and more times on the same patients. I have asked practitioners to see whether they could find the scar of the previous operation in the uterus, and not a single one has been able to do so. Not one was able to find where the scar was, so that there was good union throughout. In all these cases, however, there was a pelvic deformity. Whenever these women have a pelvic deformity they all require a second Cesarean section. There was not one of these women that required a second operation who was operated for a placenta previa or eclampsia.

I make it a point to have these patients go to the hospital early, and, if possible, I operate on them two weeks before the expected time of labor. Sometimes they would neglect going to the hospital as requested, and I would see them after they had been in labor ten or twelve hours. I consider I have been very lucky in not having a rupture of the uterus in any of them.

There is a great deal in the way in which we sew up the wound. Some practitioners have a rather slipshod way of doing this. In sewing up the uterine wound I am very particular not to include in my ligature any of the mucous membrane. I take plain ordinary catgut, not chromicized or anything else, that will be absorbed quickly, and I take a big bite through the uterine muscle up to the mucous membrane, and then on the other side just above the mucous membrane, making a running suture and bringing it together not too tightly.

I think a great deal of trouble which arises in these cases is due to the sutures being *tied too tightly* and hence they strangulate the tissues. It is these minor points that make the difference between success and nonsuccess in these cases. By running the suture right up it stops all hemorrhage and I am enabled to bring the muscular walls together, and then I run back the other way, running the same suture back to where I started and tie it. While I am doing the latter I make a kind of secondary Lembert suture. I make it a point to have the serous membrane lightly pressed in so that it comes absolutely together.

I agree with Dr. Findley that these cases ought to be watched, at least, even though they may not need an operation. I do not think one needs to fear rupture of the uterus in many of these cases. However, to be on the safe side, it is better to watch them in case operation should be needed.

Again, these women should be told something about future pregnancy. I regard this as an important point. A great many women will say to us, "I do not want any more children; I want one." But these women do not know whether that child is going to live or not; they do not know but what it will die, and what then? She may want a child in the future, and if you sterilize her in the meantime so that she cannot become pregnant again she may worry a good deal over it. If a woman has had one or two children, I

would not have any compunctions of conscience about sterilizing her, but if she has no children, or has only one child, and that child may die then I will not sterilize her for the reason that some twenty-five years ago I operated on a woman on whom I did a Porro-Cesarean section, which was the operation we did in those days, and she told me she wanted it done. Six months or two years afterward, when I met that woman, she cried and exclaimed, "Doctor, if I only knew as much as I do now I would not have allowed you to remove my uterus." So when I think of that poor woman, I hesitate twice now before sterilizing a woman who has no children.

DR. HENRY SCHWARZ, St. Louis, Missouri.—I wish to endorse every word that Dr. Findley has said. He expresses my standpoint exactly.

I wish to relate briefly two cases I have delivered within the last year through the natural passages. One was a woman on whom Dr. Webster, of Chicago, had done a Cesarean section some years before on account of obstruction to delivery by an ovarian tumor.

In the other case I did a Cesarean section three years ago. The woman was brought into the hospital with a temperature of 104° ; she was very sapremic, with an offensive discharge from the uterus. There was a dead fetus in the uterus, which was macerated. We took it out. She was a young woman, and it was her first pregnancy. After emptying the uterus and removing a subserous fibroid coming out on the left side of the uterus close to the external os and plugging the pelvis, and also after removing a smaller fibroid near the fundus, I closed the uterus because the woman was young and had had no children. I delivered this woman about seven months ago through the natural passages. In both cases I used scopolamin and narcophin during the first stage, and delivered the women just as soon as the first stage was completed.

These cases show that it is possible to deliver these women safely through the natural passages where these passages are not obstructed.

I have been very fortunate in not having many cases come to Cesarean section as emergency cases. I think we have nearer 75 per cent. of elective cases than 3 per cent. The fact that there is early rupture of the uterus during pregnancy in many cases induces me in my service to recommend hysterectomy at the time of the third Cesarean section. I think after a woman has gone through three Cesarean sections we should at least recommend removal of the uterus. Of course, if she objects, that is her business, but it is this early rupture of the uterus during pregnancy which we cannot control.

DR. JAMES E. DAVIS, Detroit, Michigan.—These two papers bring before us a most interesting phase of "preventive obstetrics." I think the advantages of this prevention should be viewed from a consideration of the pathology that prevails in these cases. Anticipating the pathology, it seems to me there should be added to what has already been said a few further considerations. In the first place, we should, in a general way, consider bad risks those women who have a thin musculature, and also those who have within the

uterus at the time of pregnancy a large quantity of amniotic fluid. It has already been mentioned that care should be taken against the introduction of a bag and the use of forceps. The problem, presenting, from a pathological standpoint is this: first, we have a reduction of muscle tissue, of connective tissue, a degradation of the normal tissue; then we have a degradation of the connective tissue by the interposition within the connective-tissue cells of syncytial cells. The connective tissue, while it may in certain instances be as strong as the muscle tissue, yet it is not as resistant to the syncytiolysins which are formed from the syncytial cells, and in the syncytial cells, we have a tissue of a very low resistance so far as its ability to withstand pressure is concerned. That might be illustrated in this way: we will consider the muscular wall. We have in the normal muscular wall connective-tissue elements which in multiple pregnancies are increased, so that we see an increase of this connective tissue everywhere in the muscular wall, but when we have only a connective-tissue wall, we have a considerable thinning of that wall which may have, and we will take it for granted, the same bursting quality as the muscle wall, but when we have interposed in the muscular wall syncytial cells which almost never occur singly but in groups, then the resisting power of the connective-tissue wall is markedly lowered. The syncytial cells may be shown diagrammatically interposed in this manner in the connective-tissue wall, and wherever these cells are interposed there we have a point of very low resistance so far as it relates to bursting pressure. Besides, we have a constant throwing off of the syncytiolysins which have a digestive effect upon the connective tissue.

DR. MAURICE I. ROSENTHAL, Fort Wayne, Indiana.—Durable suture of the uterus postpartum is a difficult thing. While the uterine wall is thick at first in a few days it is much thinner as a result of beginning involution so that primary suture, as mentioned by Dr. Carstens, will stop hemorrhage and that is about all we can expect it to do. Suturing the peritoneal surface, however, I believe is very important. In making suture of the belly wall if you will bring the skin together and there is no blood interposed, the fatty tissues will lie together and heal perfectly. Just so if you will bring the surfaces together, the peritoneal surface carefully, and there is no intrauterine pressure, the uterine wall will lie together very nicely. If you suture this wall ever so carefully, in forty-eight hours, more or less, the sutures are necessarily loose. I imagine they hang there like hoops on a line, yet they are necessary to prevent hemorrhage and leakage for the first twenty-four hours. The important thing after all is infection and that infection is predisposed by intrauterine pressure. The complete cervical dilatation of normal labor promotes a more free drainage of the uterus than frequently obtains after Cesarean section.

DR. IRVING W. POTTER, Buffalo, New York.—I would like to report a case of rupture of the uterus that occurred in Buffalo because it is the only one we have heard anything about. The patient was a young woman, twenty-three years of age, upon whom I operated

two and one-half years ago for a contracted pelvis, delivering a child 9 pounds in weight. It was a midwife's case, and she had been in labor for a considerable time when I saw her, I took her to the hospital and did a Cesarean section, she made a good recovery. She subsequently became pregnant, and fell into the hands of a practitioner who did not believe in operating and who said he could deliver her without any trouble. She had a test of labor for forty-eight hours. The scar in her abdomen indicated that a Cesarean section had been done on a previous occasion, yet she was allowed to go forty-eight hours as a test of labor, which was followed by rupture of the uterus. A surgeon was called in and removed the uterus. The child was dead.

I have operated on a number of cases a second time without any trouble, and you cannot see the scar in the majority of these cases from the outside, but if you feel from below up you will find a thinning in the majority of cases, although it is not enough to make any special difference.

DR. HAYD.—I would like to ask Dr. Bell why he did not sew the uterus together instead of taking it out?

DR. BELL.—I must confess, I was afraid she might die. In order to sew the uterus together I would have been obliged to freshen both edges entirely because, as I tried to tell you in my paper, there was a scar, and except for the fibromuscular bands across, I would have been obliged to remove the surface of the whole scar. I thought I could do the other operation more quickly.

DR. RONGY (closing).—With reference to the dictum, "Once a Cesarean, always a Cesarean," I would like to say that I brought this question up from an academic standpoint. We know what we have to contend with in actual practice; we cannot always choose our cases, neither do we always want to deliver these women by Cesarean section. I think it is very essential for us to come to a thorough and clear understanding of this question because the general medical profession look to us for a final judgment on these questions. It is very necessary for us to make ourselves clear as to what should be done in certain cases and this largely was my object in bringing up this question.

Dr. Carstens brought out a very important point with reference to tying of the sutures in the uterine wound too tightly. When these sutures are tied tightly there is always a reaction around the wound and therefore infection is more likely to take place. Great care must be exercised in suturing the uterine wound.

I never sterilize a woman unless she has had two children, and I only do it at the request of the patient. I do not perform an hysterectomy but resect the tubes on either side. I feel that after resecting and embedding the cut ends of the tube in the wall of the uterus pregnancy will not ensue. It is unnecessary to do an hysterectomy. I feel sure that our knowledge about the uterine scar is very incomplete. It seems to me that no matter how perfectly the wound united the uterus will not infrequently rupture. In performing repeated section the old scar is very often not observed

for the reason that the uterus is in a different angle, it is somewhat twisted so that the old scar is at the side of the uterus out of the line of vision and therefore not easily seen. In a great many cases however, the old scar can be readily seen.

POSTMORTEM CESAREAN SECTION.*

BY

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THERE can be no doubt that in all parts of the world it occurs with frequency that women pregnant, at or near full term, die from various disorders and are never delivered; the child perishing from its imprisonment alone, in many instances. This is a deplorable sacrifice to ignorance, indifference or sentimentalism, and it must be admitted that these qualities are not the exclusive attributes of the laity.

The indifferent and callous-minded may be stimulated to some alertness when attention is called to the fact that the law does not countenance that gross neglect which leads to the sacrifice of human life. The unborn child has rights fully recognized in legal enactments and any medical person finding the dead body of the mother covering the unborn viable child and refuses to remove the obstacle, which is suffocating the infant, is guilty of a crime for which he may be justly punished. The consent of no human being is required; time is short, and his duty is plain.

A considerable number of such cases have been reported in medical literature, and while most of the babies so delivered have not permanently survived, some brilliant successes have been chronicled. Without doubt this record may be greatly improved by the application of intelligent foresight and alertness. The unborn fetus frequently survives for a short time after the death of the mother. This fact furnishes the indication for the necessity of immediate action to save the life of a viable child in case of death at or near the end of pregnancy. Runge states that, unfortunately, the rescue of the child after the mother's death is not very common; the fetus dying in many cases before the mother through pathological conditions such as high fever, increased vascosity of the maternal blood through cardiac and pulmonary disease; or through a marked lowering of blood-pressure, especially when the mother's death struggle is prolonged.

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

More favorable cases again are observed when the mother has died suddenly as from the result of accident or from rapidly fatal poisoning. In general, conditions which obviate a long-continued death struggle, undoubtedly, are more hopeful of saving the child's life.

While the prognosis is, therefore, governed by the character of the disease, and especially by the duration of the death struggle, it is imperative in all cases that Cesarean section be performed instantly upon the cessation of the mother's heart beats. It is inexcusable to waste precious seconds of time in the effort to obtain the fetal heart sounds.

No time should be given to the niceties of surgical technic. The abdominal wall should be widely opened by one long free incision of the abdomen and another of the uterus. The child is then immediately removed and efforts of resuscitation vigorously instituted.

In Rubesca's clinic, Prague, Cesarean section after death has been performed since 1896 in six cases, one of which resulted in saving the life of the child. In this case it is notable that the mother had been dead twenty minutes before the child was extracted.

Among 331 Cesarean sections in the last century on dead women, only in six or seven was a living child obtained.

R. Dohrn compiled ninety cases, and Schwarz, in 1862, 107 cases in which not a single living child was obtained, so that the latter considered the operation unnecessary because of failure to save the life of the child. How ill-founded is this pessimistic conclusion, may well be shown by a consideration of more recent clinical reports.

I have compiled well-authenticated cases, with due references appended, from thirty-one operators; of these, fifty-two women were delivered postmortem by Cesarean section. Several of the infants which could not be saved were delivered with hearts still beating; some breathed a few times; a few lived more than a day; but the gross results were that of the fifty-two babies thirty were lost and twenty-two or 42.3 per cent. were saved.

A remarkable case was reported by Dr. J. L. Cleveland. The mother died of convulsions; owing to a number of circumstances, Cesarean section was not performed until a full hour had elapsed since the mother's death. The child was asphyxiated but heart pulsations were perceptible to the hand. It soon gasped and was fully restored. The length of time which passed between the death of the mother and the removal of the child was much more considerable than is generally supposed to be the extreme limit of possible

hope for survival of the child. Cleveland believes that when viability is limited to fifteen to thirty minutes after maternal death, the well-known capacity of the fetus for resisting asphyxia is not taken fully into account, and that it will be increased by the residual oxygen within the placenta at the time of the mother's death. Two recent cases occurring at St. Vincent's Hospital, Indianapolis, proved brilliantly successful and reflect unusual credit on two internes of that institution.

CASE I.—Reported by Dr. B. A. Hatfield. Patient, Mrs. R., seven months pregnant. Nov. 17, 1915, she complained of earache and, a few hours later, a discharge from the ear. Headache and meningeal symptoms quickly followed. Drs. Neu and Kelley called Dr. Barnhill thirty-six hours after the first symptoms. A laboratory examination showed positive pneumococcic meningitis. Patient unconscious at this time; rapid pulse; temperature 104° F. Patient was taken immediately to hospital for mastoid drainage; but Dr. K. P. Ruddell pronounced her in a dying condition and unfit for an anesthetic. She died one hour later. It had been impossible to find radial pulse for fifteen minutes before death and respirations were only about five per minute before death. Patient died at 5 P. M. Nov. 19, 1915. Five minutes after death an incision was made, about $3\frac{1}{2}$ inches long, below umbilicus in the median line and a 5-pound boy of about seven month's gestation was delivered in about three minutes, crying lustily. Baby did nicely after feedings were adjusted and is now healthy and doing as well as any normal baby of its age.

CASE II.—Reported by Dr. Clarence N. Sonnenburg, Indianapolis, Interne St. Vincent's Hospital. Mrs. R. S., aged twenty-seven, white, female, housewife. Entered St. Vincent's Hospital in June, 1916, to await confinement, which was expected at any time. No family history was obtained. Previous history: The patient had complained of headaches for the past twenty years. But beside the headaches and chronic constipation, she enjoyed good health. There was no elevation of temperature. Two years ago she was operated upon for suspension of the uterus and ruptured perineum in hopes of relieving the headaches, but with no results. Her eyes were also examined and found normal. No history of lues.

Patient had two uneventful previous pregnancies; no miscarriages. She had marked arteriosclerosis with a blood pressure varying during her pregnancy from 180, s, to 210, s. The urine contained no albumen nor casts. Two days before entering the hospital there was edema of the lower extremities which persisted. There was evidence of congestion of both lungs, endocarditis, myocarditis, and acute dilatation. On the morning of May 20, she had a pulmonary hemorrhage for which a hypodermic of morphine sulphate, gr. $\frac{1}{8}$, was given. She then rested quietly and was removed to the hospital. At 6 P. M. I was called to her room, but she died before my arrival. Efforts were made to resuscitate her while another nurse was sent to the surgery to obtain instruments for a Cesarean section. So

much time had elapsed in the effort to restore her that I feared to wait for the instruments and performed a Cesarean section with a pearl handled knife, 5.5 inches in length, with 2.5 inch blade. The knife was new, sharp, and had not been used before. Without removing the body from the bed I made an incision commencing 1 inch above the umbilicus and extending 6 inches downward in the median line. There was no hemorrhage. The second incision was made into the uterus, sufficiently large to introduce my index-finger, which was used in place of a groove director to prevent injury to the child. I removed the baby from the uterus and ligated the umbilical cord.

The baby, a girl, was resuscitated in four minutes and has been gaining in weight rapidly. It was full term, weighed seven and one-half pounds, and normal in all respects. The baby is still living, hearty and well.

Successful cases were reported by Hanch, one; Cathala, one; Descurres, one; Bonnaire, one; Leuppert, one; Möglick, one; Moetague, one; Maygeier one; Cleveland, one; Weissnange, one; Koerner, one; Wyder, one; Everke, one; Keinski, two; Rudens, two; Blau, one; Loerssin, one; St. Vincent's Hospital, Indianapolis, two; Lying-In Hospital, New York, two.

Failures were reported by Cathala, one; Bonnaire, one; Porak, one; Boissard, one; Leuppert, two; Lippel, one; Remy, one; Vermden, one; Koerner, two; Wyder, one; Everke, two; Keinski, one; Litschkiss, one; Tyler, one; Howe, one; Kallmoegen, one; Hell, one; O.G.P., one; Lying-In Hospital, New York, eight. Hence in fifty-two cases of postmortem Cesarean sections the life of the child was saved twenty-two times; lost, thirty times.

In conclusion I would express myself as in sympathy with the suggestion that in certain cases of pregnant women, at or near term, who are known to be hopelessly ill from rapidly progressing disease, Cesarean section is justifiable to save the life of the child. Of course if she be conscious the patient's consent must be obtained. If this were the accepted rule, no doubt many lives could be saved which are lost under the present plan of waiting for the mother to breathe her last, and for the final heart-beat to give us the tardy signal for action.

NEWTON CLAYPOOL BUILDING.

DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—It seems to me that the doctor has demonstrated this to be a rather new type of operation. Postmortem hysterotomy has been done in our town twice of late in the hospitals. The intern sat by the side of the bed until almost the last moment, and then proceeded to deliver both cases with a live child. Both were medical cases; they did not occur in my service, so I do not know the details. Cases like this should appeal to the hospital young man and make him alive to the circumstances.

DR. O. H. ELBRECHT, St. Louis, Mo.—This paper has interested me very much. There are certain medicolegal questions that come into play in these cases which we have to consider. In the cases of Dr. Pfaff these questions would not come up because his cases were brilliant successes, on the other hand, if you do a postmortem without the consent of the family, you are liable by certain laws in this or that State. In Austria there is an old law on the statute books that makes it compulsory for the first doctor who sees the corpse of a pregnant woman of six months or more gestation within one hour of the time of death to do a postmortem hysterotomy. Judging from the fact that this old law still exists it would seem that enough babies have been saved by the procedure to make it justifiable. In our country the legal question must be considered, because if we perform a postmortem without consent of the family and do not save the child we are rendering ourselves liable to a lawsuit. If you have time to consult relatives about this you can point out to them the possibilities and by so doing you are not liable in a case of nonsuccess.

I wish to congratulate Dr. Pfaff on the result in both cases.

DR. EDWARD J. ILL, New Jersey.—Such cases as Dr. Pfaff has reported are very interesting and instructive to us. It is always proper to open a woman immediately after death and remove the child.

I may say that the reason for the Austrian law compelling every practitioner to do a Cesarean section on the dead woman is that the baby may receive the blessing of baptism.

DR. PFAFF (closing).—There is not very much I wish to add to what I have already said, but the legal point is one I think we should not overlook. I have looked it up lately and the sum and substance of it is like this: this is a living child; it is a human being that has rights moral as well as legal. I think it is well established that a living unborn child has legal rights. Here is a dead body lying in such a relation as to threaten the life of this human being, and I do not think any one of us would knowingly allow this dead body to jeopardize the life of another individual. Recently I read a decision of the kind which holds that a human life that is jeopardized should have intelligent treatment, and the doctor, the only informed person present, is the one who should give that intelligent treatment. We have no right to imperil the life of the living child though unborn, and the doctor has no right to kill that child by his gross neglect. He would be sustained by the law, should he interfere even against the protest of the husband or others.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I would like to ask if there is any Jewish law in the Talmud that a woman like this must be opened? I think there is such a law that has been handed down to us from prehistoric times. However, I am not very well posted on this phase of the subject.

DR. HENRY SCHWARZ, St. Louis.—Dr. Carstens refers to the *lex regia* of Numa Pompilius, the second king of Rome. It is a good

old Roman law and will serve as a precedent in the United States any time.

DR. PFAFF (closing).—An attorney was recently asked to address the New York Academy of Medicine on this subject and he brought out very clearly and distinctly that the law would stand by us in cases of forced intervention, but it would not stand by us if we refused to interfere.

GUNSHOT WOUNDS OF THE ABDOMEN IN PREGNANT WOMEN.*

BY

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Toledo, Ohio.

On October 21, 1915, Mrs. A. K., aged twenty-five, the mother of one child, being pregnant at full term, was accidentally shot in the back by her husband. The bullet entered about an inch below the twelfth rib, on the right side, at the outer edge of the quadratus lumborum and could be felt lying under the skin of the abdomen about 2 inches above and 2 inches to the right of the umbilicus. The patient, on admission, was rather poorly nourished, but the heart and lungs were normal and the urine free from albumin. She seemed to be in much pain, was greatly frightened, but not in severe shock. P. 100, T. 99.4°, Res. 26 and entirely thoracic. The abdomen was tense and hard, very sensitive and slightly distended. A small amount of blood was escaping from the wound in the back. The child's heart was strong and nearly normal in rate.

The woman's condition demanded immediate exploration of the abdomen. This was done within less than three hours after the accident. The peritoneal cavity contained a large amount of free blood and coagula. Amniotic fluid was found mixed with blood free in the abdomen. A perforation could be felt on the posterior wall of the uterus, somewhat to the right of the midline and about 3 inches below the fundus. A second perforation was present on the anterior wall of the uterus a little nearer the midline than the posterior wound, and about 2 inches below the fundus. The course of the bullet between the two openings was about 5 inches. It was found impossible to properly explore the abdomen for intestinal perforations on account of the presence of the full-term uterus. Cesarean section was, therefore, immediately done. The incision in the uterus was immediately over the placenta, located anteriorly and in the upper part of the uterus. The placenta had been perforated by the bullet. The child was delivered readily and began to breathe immediately. It was uninjured except that the ring finger on the left hand had been broken and lacerated by the bullet. The uterus contracted normally. The uterine incision and the two bullet wounds were closed with chromic catgut.

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

The excess of blood was sponged out of the abdomen, and the entire intestinal tract examined for perforations. It was found that the bullet had entered between the folds of the mesentery of the ascending colon and passed through the gut making two perforations. It had then gone through the uterus and into the abdominal wall without injuring the small intestines or any other organs.

The escape of the small intestines was due to the fact that the uterus, as is usual, lay more to the right side of the abdomen and the small intestines to the left, and also to the fact that the bullet passed through the right side of the uterus.

The perforations in the colon had leaked very little. They were closed in the usual way. The posterior opening, which was in a part of the gut not covered by peritoneum, was closed as well as possible, and a drain passed down to it. There was no leakage from the bowel after the operation. The abdomen was drained by inserting three soft rubber tubes; one to the bottom of the cul-de-sac, another to the outside of the ascending colon, where there had been some soiling, and a third at the point of perforation. The mother left the operating-table with a pulse of 100 and made an uninterrupted recovery. There was some drainage of pus with a colon bacillus odor, but no drainage from the intestine. The highest pulse rate after the operation was 120. The highest temperature 101° F. Patient was in the hospital thirty-five days and left with the wound entirely healed. She was able to nurse her baby. The child was a strong hearty infant and has developed nicely. The broken, lacerated finger was pieced together and healed, *per primam intentionem*, slightly deformed.

A gunshot wound in the abdomen of a pregnant woman differs somewhat from one in the abdomen of a woman who is not pregnant. The dangers of hemorrhage and of infection from a perforated intestine exist in each; but the pregnant woman, on account of her condition, runs a greater risk. The danger of a bullet causing serious hemorrhage in the abdomen is greater during pregnancy, and this danger increases as gestation advances.

Infection in the abdomen of a woman is more serious during pregnancy than at any other time. This fact is well borne out by the high mortality from ruptured appendices among pregnant women.

The management of a gunshot wound in the abdomen of a pregnant woman differs chiefly in the problems which arise from the presence in the abdomen of the enlarged uterus or from the injuries this organ may receive. The question at once arises whether the uterus shall be emptied or not, and whether it shall be done by Cesarean section, with or without hysterectomy.

It is a well-settled principle in civil practice, where conditions permit that, when a bullet perforates an abdomen, an exploratory

laparotomy shall be done without delay. This rule applies with even greater force in the case of pregnant women because there is the added danger of injury to the enlarged uterus along with the inherent risks which accompany the pregnant condition.

In this connection it is interesting to note that in not a few of the cases reported in the literature, in which pregnant women were shot through the abdomen, recovery took place without operation. Moreover, in quite a number of the cases in which the abdomen was opened, no intestinal perforations were found. In these cases the pregnancy was usually well advanced, so that the intestines were pushed up out of the lower abdomen. The wounds themselves were, as a rule, well below the umbilicus.

In the care of perforating wounds of the abdomen in pregnant women the question of emptying the uterus arises immediately. All will depend upon the general condition of the patient, whether the uterus is injured or not, and whether the pregnancy is in an early one or near term.

It is worthy of note that, in the cases found in the literature, in which the uterus was perforated or severely injured, the organ promptly emptied itself in the majority of cases. If the pregnancy is at term, even with the uterus uninjured, it is necessary to do a Cesarean section because it is very difficult to properly explore an abdomen if it contains a full term pregnancy. Moreover, as the child is fully developed it is to its best interest that it be delivered, at once. Another reason why the uterus, at or near term, should be emptied in the case of a bullet wound of the abdomen is, that if a perforation of the intestine is present, peritonitis may develop, the risk from which will be greatly increased if labor sets in within two or three days after the operation and before the infection is securely walled off.

In treating peritonitis we endeavor not only to keep the patient quiet, but even prevent peristalsis so that adhesions may form and localize the infection. It is easily apparent that a violently contracting and finally collapsing uterus would be very likely to break up adhesions and spread an infection which might otherwise become localized. In the presence of an actually existing peritonitis, or in an abdomen badly soiled with feces, one might not open an uninjured uterus and expose its well known avenues of infection to contamination unless it were done chiefly in the interests of the child.

In pregnant women with gunshot wounds of the abdomen the gestation has not always advanced to a point when the child is viable. The uterus, too, may not be large enough to greatly impede

an exploration of the abdomen. In such cases the emptying of the uterus will depend upon whether the organ has been seriously damaged or not. If the uterus is uninjured or only superficially wounded, it may be left alone. If, on the other hand, the uterus is shot through, it will probably be safer for the mother if the gestation is terminated at once. It is worthy of note that in the cases reported in which the uterus was shot through, the child was usually killed by the bullet and abortion followed quickly.

In an early pregnancy it will make less difference whether an injured uterus is emptied or not because if it aborts it will cause less commotion and be less likely to spread infection. Moreover in such cases, if there is no injury to the intestines, one may be more conservative with an injured uterus, because infection is less likely to develop.

The method of emptying the uterus will depend upon the duration of pregnancy. As the abdomen is already open Cesarean section will naturally be used if the child has reached any considerable size. In the earlier stages the pregnant uterus, unless badly lacerated, should be left to take care of itself or emptied through the cervix. In certain cases, when the uterus is badly lacerated, or when for some reason it is infected, hysterectomy will be necessary. Hysterectomy in gunshot wounds of the uterus is rarely necessary. The patients are considerably shocked by the hemorrhage and fright. This shock will be augmented by the necessary inspection of all the abdominal organs, including the entire intestinal tract. The uterus is not necessarily infected and will take care of itself almost as well as the other abdominal organs. The woman herself will be more likely to combat the infection if her vitality is not lowered by too much surgical intervention.

Drainage will, of course, be used in all gunshot wounds of the abdomen in pregnant women. There will be considerable blood in the abdomen which cannot be removed during the operation, and this blood serves as a culture medium for infection which a dirty bullet or a perforated intestine may furnish. Moreover, in the rapid inspection of the intestinal tract, one cannot be certain that he has not overlooked a perforation. Good drainage will remove the blood more safely than it can be done by irrigation. Irrigation of the abdomen in cases of gunshot wounds will rarely be necessary. Occasionally, when there is extensive soiling of the peritoneal cavity by feces, and when the case is early and the patient's condition otherwise good, it may be considered.

Neugebauer(1) was the first to report the cases of gunshot wounds of the pregnant uterus. He found twelve cases.

Estor and Puech(2) reported all kinds of perforating wounds of the pregnant uterus and among them ten due to gunshot wounds.

Gellhorn(3) went over the literature and reported all cases up to that date. The following represents a fairly complete list of all cases to date.

CASE I.—Mrs. J. M., in the seventh month of pregnancy, was struck in the buttock by a bullet which passed upward and inward into the uterus without injuring any other organ(4). Blood and amniotic fluid escaped immediately from the cervix. Labor came on almost at once and she was delivered promptly. Recovery was uneventful without further interference.

CASE II.—A Chinese woman, twenty-six years of age, in the ninth month of pregnancy, received a bullet wound in the abdomen three inches above and a little to the left of the umbilicus at about the level of the fundus of the pregnant uterus(5). The pulse was 126 and weak. The respirations were 28 and the general condition good. The abdomen was opened and much blood with clots removed. The intestines were not perforated. A bleeding wound one inch long was found on the anterior part of the fundus. The placenta, lying under this wound, had been perforated. A living child was delivered by Cesarean section and the abdomen was drained. The mother died on the fourth day of hemorrhage, it was thought.

CASE III.—Mrs. W., aged twenty-eight, in the seventh month of pregnancy, was struck in the abdomen by a bullet at a point 3 inches above and 2 inches inside of the right anterior superior spine(6). There were no signs of hemorrhage, no distention and the fetal heart could be heard. Twelve hours after the injury the abdomen was opened. Cesarean section delivered the child which had been killed by the bullet. A hysterectomy was done, using the wire *écraseur*. Six perforations of the ileum were found and a large mesenteric artery ligated. The abdomen was washed out with boric acid solutions and a glass drainage tube was inserted. Operation one and a half hours. Death occurred on the seventh day from peritonitis.

CASE IV.—A woman, nineteen years of age, in the eighth month of pregnancy, received a thirty-two caliber bullet $1\frac{1}{2}$ inches below the ensiform cartilage and a little to the left. There were signs of internal hemorrhage, with distentions and absence of liver dulness(7). Operation two hours after the injury revealed much blood from a liver wound and also two perforations in the stomach. The bleeding was checked, the perforations closed, and the abdomen was irrigated and closed with drainage to the liver wound. The uterus was not wounded, but the woman was delivered normally on the second day. The recovery was uneventful except for a little pus from the liver drainage.

CASE V.—Mrs. M., twenty-one years of age, and in the sixth month of pregnancy, was shot in the upper abdomen(8). The bullet passed through the liver, diaphragm, pleura and the left lung. The uterus was uninjured. After some sign of pneumonia she recovered without operation and six weeks later was delivered normally.

CASE VI.—Eva M., aged twenty, colored, in the sixth month of pregnancy, was shot in the abdomen at a point 4 inches to the right of the umbilicus(9). There was no shock, and pulse was 100. On opening the abdomen it was found filled with blood. There was a large wound in the fundus of the uterus just in front of the right tube. There was no wound of exit. The bleeding uterine wound was closed. There were no wounds of the intestines. The abdomen was washed out and drained. The patient aborted the next day and the fetus was found to have been killed by the bullet. The mother recovered.

CASE VII.—A woman, twenty-eight years old, pregnant at full term, was wounded in the abdomen at a point 2 inches above the right anterior superior spine of the ileum(10). The course of the bullet was downward and forward. There was no shock or other serious symptoms. In forty hours she was delivered of a dead child with the bullet in its abdomen. The mother recovered.

CASE VIII.—A bullet penetrated the abdomen and the walls of the uterus in a pregnant woman and killed the fetus(11). The mother recovered.

CASE IX.—A woman, pregnant at full term, was shot with a rifle in the lower abdomen(12). There was a severe hemorrhage followed by syncope. Labor followed immediately and patient was delivered without laparotomy. Both the mother and child lived.

CASE X.—A colored woman, eighteen years old, in the sixth month of pregnancy, was struck by a bullet $1\frac{1}{2}$ inches above the right anterior superior spine of the ilium(13). There was no wound of exit. Labor followed with delivery the next day. The bullet had passed through the child. Severe infection followed but the mother recovered. There was no operation.

CASE XI.—A woman, nine months pregnant, was shot in the abdomen. Amniotic fluid and blood escaped(14). She was delivered normally in eleven hours. The child had been struck by the bullet and lived only eight hours. The mother had symptoms of peritonitis, but recovered without operation.

CASE XII.—A woman, five months pregnant, was wounded by a bullet to the right and below the umbilicus(15). There were no serious symptoms. Laparotomy in six hours revealed a wound of the uterus 3 inches below the fundus with no wound of exit. The uterine wound was sutured and the abdomen closed without drainage. Two days later she was delivered of an uninjured five months' fetus. The mother recovered.

CASE XIII.—A woman, nineteen years old, four and one-half months pregnant, received a bullet wound in the abdomen 5 inches to the right of the umbilicus(16). There was severe shock. Laparotomy after five hours showed a large amount of blood and

amniotic fluid in the abdomen. Five perforations of the ileum necessitated resection. A large mesenteric artery was bleeding and was ligated. The uterus was perforated and the umbilical cord protruded. The piece of cord was resected and the stump pushed back into the uterus and the uterine wounds sutured. The abdomen was closed with drainage. The fetus was delivered thirty hours later. The mother recovered.

CASE XIV.—Reports that Billroth saved a mother's life in a case similar to Albarrans(17).

CASE XV.—Cesarean section with fatal result(18).

CASE XVI.—A woman of eighteen years at term received a bullet wound to the right and below the umbilicus(19). There was little shock and no external bleeding. Labor set in in one hour and delivery was accomplished in twelve hours. Sharp postpartum hemorrhage necessitated manual delivery of the placenta. The hand in the uterus showed a hole in the anterior wall of this organ. The bullet had killed the child. The mother recovered without operation.

CASE XVII.—A woman, aged thirty-four, in the eighth month of pregnancy, was shot in the right lower abdomen(20). There was much pain and loss of blood and amniotic fluid. The child's movements stopped at once and the fetal heart could not be heard. Labor pains began very soon. Laparotomy showed a wound in the uterus 2 inches below the right tube, but no injury to the intestines. A dead child was delivered by Cesarean section and the abdomen drained. The mother recovered after a serious septic period.

CASE XVIII.—A woman of twenty-nine, at full term, was shot in the left side of the abdomen(21). A quantity of yellow fluid escaped. There was considerable peritoneal irritation. Laparotomy three and a half hours after the accident showed a wound in the fundus below the left tube. Cesarean section delivered a dead child. The bullet wound was sutured and the abdomen closed without drainage. No intestinal perforation was noted. The mother died on the sixth day of peritonitis.

CASE XIX.—Bullet wound of the uterus perforating the pelvis and uterus(22).

CASE XX.—A woman of nineteen years, in the seventh month of pregnancy, was shot in the right side of the abdomen 2 inches above the anterior superior spine of the ilium(23). There was evidence of severe internal hemorrhage. Laparotomy showed the uterus perforated, but no intestinal injury. Cesarean section delivered a living six and one-half months' fetus which soon died. Drainage was instituted and the mother recovered.

CASE XXI.—A pregnant woman was torn open by a cannon ball and a living child delivered(24).

CASE XXII.—A woman, three months pregnant, was shot in the abdomen receiving eight perforations of the intestine(25). Operation was done and the perforations closed. The woman recovered.

CASE XXIII.—A woman of nineteen years, six and a half months pregnant, was stabbed in the abdomen $1\frac{1}{2}$ inches below and

4 inches to the right of the umbilicus(26). The wound healed uninterruptedly. She was delivered at term of a living child with intestines protruding through healed abdominal wound.

CASE XXIV.—A woman of nineteen years, in the eighth month of pregnancy, was wounded in the left abdomen midway between the anterior superior spine and the umbilicus(27). There was a second wound 4 inches above this. There were two wounds of exit. Laparotomy showed much blood, but no intestinal injuries. The fundus was perforated in two places. Cesarean section was done and the abdomen closed. Both the mother and child recovered. The child was injured only in the fingers.

CASE XXV.—Woman of twenty-three years, seven months pregnant, was shot in the abdomen $2\frac{1}{2}$ inches below the ensiform cartilage, and $\frac{1}{2}$ inch to the right of the midline(28). Pulse 120, temperature 100° , respiration 28. Serous fluid and gas were escaping from the wound. The abdomen was opened twenty-four hours after the accident and the stomach and jejunum found perforated. The abdomen contained pus, blood and stomach contents. There were many adhesions. The uterus was not injured. The abdomen was washed out and searched for further perforations. The perforations were then closed and the abdomen drained. The woman was delivered normally at full term.

CASE XXVI.—Henrot reports that a mother while on her way to the maternity hospital in Rheims had her abdomen torn open by a shell and died immediately(29). The child was uninjured and had only to be lifted out.

CASE XXVII.—Penetrating gunshot wound of gravid uterus(20). (Case Report.)

CASE XXVIII.—Mrs. F. F., an Italian woman, thirty-six years old, in the fourth month of pregnancy, received a load from a shot gun in the right lower quadrant of the abdomen(31). She was admitted in shock and with a distended abdomen. The wound was bleeding freely. Temp. 98° , pulse 63. At operation forty small perforations of the intestines were closed. The uterus showed a 4-inch laceration on its anterior wall, which was a tear, and not due to the shot. The fetus was free in the abdominal cavity, and the placenta was still in the uterus. The placenta was removed and the uterus closed as in Cesarean section. The abdominal cavity was irrigated and closed with drainage. The mother made a good recovery.

CASE XXIX.—A girl of sixteen years, at full term, shot herself in the abdomen(32). The bullet entered 7 inches to the right of the umbilicus and made its exit an inch to the left of the umbilicus. There was little shock, pulse 116, respiration 34. The umbilical cord protruded from the wound of exit. On opening the abdomen a full-term child was found free in the abdomen. It had been killed by the bullet. A powder burned diagonal wound, 4 inches long, was found in the uterus. The placenta, which was still in the uterus, was removed, and the uterus closed after the wound had been

trimmed. The abdomen was irrigated and closed with drainage. There was some infection, but the mother recovered.

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DISCUSSION.

DR. JOHN D. S. DAVIS, Birmingham, Alabama.—I do not like to let this paper go by without some discussion, I desire to report a case of gunshot injury in a woman pregnant three months and a half. She was handling a small rifle when it accidentally went off and shot here through the abdomen, making twenty-one perforations, two through the mesenteric border of the transverse colon, and

nineteen through the small intestine. She was brought by train eighty-five miles, and I saw her twelve hours after the reception of the injury. There were five perforations on the mesenteric border of the intestine, two perforations on the mesenteric border of the transverse colon. I turned back the serosa of transverse colon, turned in the musculature, and then closed the serosa over this. Instead of doing two resections, I took out 5 feet of the intestine including the nineteen perforations in the gut, and she recovered, and was delivered of a living child at the ninth month.

TEACHING OBSTETRICS UNDER IMPROVED CONDITIONS.*

BY

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SEVERAL factors render conditions for teaching obstetrics, in the reorganized Washington University Medical School, sufficiently favorable to enable the Department of Obstetrics and Gynecology to do reasonably good work alongside of the Departments of Medicine, Surgery and Pediatrics, all of which have been placed on a strict university basis.

The main reason for this desirable state of affairs is found in the friendly attitude of the Corporation of the University and of the Executive Faculty toward the Department of Obstetrics and Gynecology; both of these bodies appreciate the desirability of placing obstetrics likewise on a university basis, and they are determined to bring this about as soon as circumstances will permit.

In the meantime, they have made very reasonable provisions for this department by giving it reasonable laboratory space and by furnishing it with dispensary and hospital facilities unsurpassed anywhere; they have taken further care of the department by an annual budget, which provides effectively for laboratory and teaching supplies and equipment; the budget also provides salaries for one laboratory technician, one laboratory instructor, one resident physician, two assistant resident physicians, and a modest salary for the chief of the department. The department's house staff consists of one resident, two assistant residents, and three house officers; all six are taken care of in splendid officers' quarters; they receive their keep and laundry; but the house officers receive no salary.

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

Before the reorganization of the school, the department was under considerable annual expense in maintaining its own museum and its own library; this expense is now entirely done away with, because the department of pathology takes care of all pathological specimens in an excellently furnished museum where they are, at all times, available for teaching or for investigation; in like manner, the splendid library of the medical school, which already contains over 23,000 bound volumes, and which receives 353 of the most important medical periodicals, of which over 300 are in complete series, makes it unnecessary for the department to expend money for library purposes. Laboratory guides, text-books and other publications, which the department desires for more or less continued use, are promptly supplied; in fact, during the summer vacation when the library committee is not in session, the heads of departments are empowered to order on their own judgment such publications as they stand in urgent need of to the amount of thirty dollars for each department. The school workshop is another time and money saving institution; it has proven especially helpful in keeping manikins and other teaching apparatus in repair.

The temporary quarters, which the Department of Obstetrics and Gynecology at present occupies, were placed at its disposal by the Departments of Medicine, Surgery and Pathology; I take particular pleasure in recording the fact that each of these departments gave up some of its very best space, so that Obstetrics and Gynecology are housed as comfortably as are Medicine and Surgery, and, were it not for the fact that these latter departments will, before long, need the space which they have given up temporarily, there would be no urgent need for a women's clinic, which the university expects to erect on the medical campus.

On this campus are located the North Laboratory Building and the South Laboratory Building, housing the departments of Anatomy, Biological Chemistry, Physiology, Pharmacology, Experimental Surgery and Preventive Medicine; the Dispensary Building, housing the Department of Pathology and Bacteriology on the two upper floors; the clinical laboratories (pathological, bacteriological, physiological and chemical) of the Department of Medicine on the second floor, and the Washington University Dispensary on the first floor and the basement; on the third floor are also the headquarters and laboratories of the Department of Obstetrics and Gynecology; on this campus are also located the Barnes Hospital, the Saint Louis Children's Hospital and the Home for Nurses; two private residences which were on the site before it became a medical campus, have been

arranged to serve as a temporary hospital for colored patients; plans have been completed and specifications drawn for the erection of a new pavilion for colored patients on a less conspicuous part of the campus; when this is completed, these former residences will be torn down, and the Women's Hospital erected on this site. All buildings on the campus are connected by corridors and tunnels and a central power plant furnishes light, heat, power, refrigeration and compressed air to all of them.

THE DISPENSARY SERVICE

The dispensary for women is conducted on the first floor of the dispensary building daily from 2 to 4 P. M. in the splendidly equipped dispensary rooms of the Department of Surgery, which uses these rooms in the forenoon only. The hearty coöperation of the Department of Nursing, and the Department of Social Service helps a great deal to render the dispensary service satisfactory to the patients and to the dispensary staff.

The fact that the dispensary hours fall in the afternoon makes it possible to detail one house officer and one assistant resident for dispensary duty, thereby reducing the burden on the chief of clinic and his assistants and compensating any irregularity in their attendance. This part of the service, however, is so important to the department and confers such benefits on the volunteer staff, that irregularities in attendance are very exceptional, and there is always a waiting list of competent men, who have grown up in the department and who are anxious to fill vacancies.

In the dispensary gynecological and obstetrical patients are segregated; the gynecological cases are treated or asked to enter the Barnes Hospital, according to the nature of the cases; the obstetrical cases are encouraged to come to the dispensary early and at regular periods. Besides the regular dispensary record, a special obstetrical record is kept, which remains in the care of the house officer on obstetrical out-patient service. A prenatal nurse, who is a salaried social service worker, and who is assisted by student-nurses, gives the expectant mothers necessary instruction at the dispensary and at their homes, visits them to ascertain their home conditions, and follows them up in case they fail to return to the dispensary as instructed.

Normal cases, whose home conditions are adequate, are delivered at their homes, unless they prefer to come into the hospital and are able to pay the ward fee; all other cases are recommended for admission to Barnes Hospital. When one of the cases registered for home

delivery goes into labor, a telephone call is transmitted to the house physician on out-patient duty; he details one of four senior students, who are on obstetrical service and who have comfortable quarters above the Womens' Colored Ward, to the case, and accompanies him or follows him as soon as possible; in daytime an obstetrical nurse (a senior student nurse) is likewise furnished. In case of serious complications a city ambulance is called and the parturient woman is transferred to Barnes Hospital as a free patient.

Women who are delivered at their homes receive postnatal nursing care, are regularly visited by the attending senior student and a house officer, and return to the dispensary for a final examination and formal dismissal at which time their baby is entered at the clinic for well babies conducted by the Department of Pediatrics; if they fail to return to the dispensary for this purpose, they are followed up by social service workers.

The work of the obstetrical out-patient service is controlled by an instructor, who sees to it that proper records are kept and preserved, and who drops in on the service at unexpected times to see that the patients receive the proper attention and visiting.

THE HOSPITAL SERVICE.

The admission of patients to the obstetrical and gynecological service of Barnes Hospital is the duty of the resident, or in his absence of one of the assistant residents, after the requirements of the front office have been complied with.

Barnes Hospital is not a free hospital, but an ample number of free beds are available in the following manner: Each of the three services is entitled to one free patient for every four pay-patients, so that if the obstetrical-gynecological service has twenty-four pay-patients, that service is entitled to six free patients.

Additional free beds have been made available by the liberality of Mr. Robert S. Brookings, the president of the University, who personally pays for twenty free beds each day of the year. The free beds are distributed as follows: Medicine eight, Surgery eight, Obstetrics four. This is a fair distribution made at the suggestion of obstetrics, because medicine and surgery have to take care of all the specialties; yet obstetrics wanted a free-bed-budget of its own which it can use to the following advantage:

The free beds allowed by Barnes Hospital, under the four to one rule, are all used up from day to day, and it would often be impossible to admit obstetrical patients on the free list when they come in as emergencies or when they are wanted for bedside instruction, were

it not that by arrangement with Mr. Brookings the 1460 free hospital days, provided by him for obstetrics, can be used up at the time when most needed, that is, during the session of the medical school. By using fewer than four Brookings beds per day during the early part of the fiscal year, a larger number than four are available during the school session.

All hospital cases, except emergency cases, are carefully worked up by the house-staff before being seen by the visiting instructors. The house-officers take histories, make physical examinations, do the routine laboratory work in the ward laboratory, enter the findings of instructors or of the chief on the record, have cases prepared for delivery or operation, assist in major operations and perform minor operations under supervision.

Two instructors make regular ward rounds and supervise the work; they are on alternating service; each serves six months on obstetrics and six months on gynecology; they submit written suggestions as to diagnosis and treatment in important cases, which are discussed in conference; they do considerable emergency work and also major operative work with the approval of the chief or his associate (Dr. Crossen).

All material obtained by operation, including curetments and trial excisions, is sent to the department's laboratory, where slides are prepared and filed away for permanent record; for the purpose of diagnosis in doubtful cases the Department of Pathology, which is located on the same floor, is freely consulted; a pathological diagnosis is sent to the ward in all cases and entered on the patient's record. Gross material, which is desired for permanent preservation, is turned over to the Department of Pathology, which attends to the proper preparation and cataloguing of museum specimens.

In case a patient dies, the consent for autopsy is usually obtained; members of the house-staff are present at the autopsy and attend the clinical and pathological conferences which the Department of Pathology conducts once a week. All clinical records are looked over at a staff conference before being sent to the record room for filing.

The house-staff rotates in the various duties as follows: each house-officer serves four months on the obstetrical house service; four months on the obstetrical out-patient service and four months on the gynecological house-service; the assistant residents alternate every six months; while one works in the histopathological laboratory of the department and in the dispensary, the other is on duty in the pavilion for private patients, performing the same duties to

private patients as the house-officers perform to ward patients; to this private pavilion service are admitted private patients of the chief of the department and of his associates in the service (Drs. Crossen, Gellhorn, Royston, Schlossstein, O. Schwarz and Taussig); besides these duties the assistant residents act as alternates to the resident, so as to have an admitting officer on duty at all times.

THE UNDERGRADUATE COURSE IN OBSTETRICS.

Since our students enter with two years credit in college work, which must include chemistry, physics and biology, it has been found feasible to simplify the course in the medical school and to devote the first year and the first and second trimester of the second year to anatomy, biological chemistry, physiology, pharmacology and bacteriology.

The next period of two years, that is, from the beginning of the third trimester of the second year to the end of the second trimester of the fourth year, is devoted to the main clinical branches, namely, Medicine, Surgery, Obstetrics and Pediatrics; the specialties are given comparatively few hours and those mostly in the dispensary service.

In this way the prescribed curriculum comes to a close at the end of the second trimester of the fourth year, leaving the last trimester or approximately eleven weeks for elective work; of this elective work not less than 150 hours must be taken in one of the four main clinical branches; the remaining 150 hours or more can be devoted to the specialties.

In the allotment of hours the curriculum committee has tried to keep well within the number recommended in the Model Medical Curriculum prepared under the direction of the Council on Medical Education of the American Medical Association in 1909.

In that curriculum 240 hours were recommended for Obstetrics and Gynecology, exclusive of the time spent in attending labor cases; I find these hours quite sufficient if the course can be properly spread out and balanced; our undergraduate course is divided into a Junior Course and a Senior Course of 121 hours each, and each course lasts exactly one year.

If at the end of these two years a student has failed to get a passing grade, he has the last trimester of the fourth year left for the removal of conditions.

THE JUNIOR COURSE.

This course consists of seventy-seven hours of recitations, twenty-two hours of laboratory work and twenty-two hours of exercises in

diagnosis, besides considerable practical work in the dispensary during vacation between the second and third year.

RECITATIONS.

These are limited to eleven hours during the third trimester of the second year; they are delivered by the chief of the department and an effort is made to interest the student in the subject of obstetrics, to acquaint him with desirable text-books and to stimulate him to do some work during vacation.

These recitations cover the anatomy and physiology of the female organs of generation and the fertilization and implantation of the ovum; they serve as an introduction to the recitations given in the first and second trimester of the third year, when forty-four recitations, two a week, deal with the physiology of pregnancy, labor and the puerperium, during the first trimester, and with the pathology of these conditions during the second trimester; while twenty-two recitations deal with the essentials of gynecology; time is taken out of the hours for recitations in the second half of the second trimester for practicing forceps deliveries, versions and pelvic end extractions.

THE LABORATORY COURSE AND THE COURSE IN DIAGNOSIS.

For these courses the junior class is divided into three groups; each group takes these practical courses in a different trimester. Twenty-two hours are devoted to laboratory instruction in obstetrical and gynecological pathology; the remaining twenty-two hours are devoted to exercises in obstetrical diagnosis; points in history taking are discussed; the student is drilled in pelvimetry; in inspection, palpation and auscultation of the pregnant abdomen and in pelvic examinations; he must be able to convey his findings to paper and make a correct obstetrical diagnosis; he acts as witness in the delivery rooms and studies puerperal involution and the changes in the new-born in the wards. At the end of this course the student is subjected to a practical examination, and he is not allowed to take up the senior work until he has proven his qualification. Both of these practical courses are given by the one instructor, who is on a salary; he is assisted by members of the house-staff.

THE SENIOR COURSE.

This course consists, first of all, in the attendance of cases of labor under supervision; groups of four students live in the obstetrical out-service quarters throughout the year; this service is especially

active during vacation, so as to provide students with the necessary credits for practical work, without taking them away from other schoolwork; each student is required to attend fifteen cases of labor and to take care of the puerperal woman and her baby for two weeks or longer; the number of required cases has been raised from ten to fifteen, because the State of Pennsylvania requires that candidates for admission to practice have delivered at least twelve women. Our classes are still so small that many ambitious students deliver thirty or forty cases and more; the time so spent is not included in the 242 hours of the curriculum.

During the session the senior class is divided into three groups, of which one group is on the medical service, another on the surgical service and the remaining group is split into two sections which are rotating between the obstetrical and the pediatrial service.

The obstetrical section, composed of one-sixth of the senior class, thus changes every five and one-half weeks; during that time the group works on the hospital service from nine to twelve every day of the week; this constitutes ninety-nine hours of schoolwork in the curriculum. The students now act as clinical clerks; they are assigned cases and work them up under the guidance of the house-staff; they participate in the ward rounds; assist in the operating rooms and attend cases of labor; in fact, they participate in the entire work of the hospital and are expected to look after their patients after school hours and on Sunday just the same as their teachers must do; they reside during these five and one-half weeks in the obstetrical out-service quarters; receive additional instruction on the manikin and are given such a prolonged practical test and examination that this part of the course may well be compared to the German "Staatsexamen."

During the first and second trimester of the fourth year the entire senior class meets the chief of the department once a week in the clinical amphitheater from twelve to one o'clock; this hour is filled by clinical lectures and demonstrations on obstetrical and gynecological topics. These twenty-two hours bring the senior course up to the 121 hours of the curriculum and serve the very good purpose of keeping the classes under absolute control to the end of their two years' course in obstetrics.

The Dispensary and the Hospital Service and the Undergraduate Instruction does not exhaust the activities of the department; there is a beginning of graduate instruction; there is the instruction both practical and theoretical to the students in the Department of Nursing; there has recently been instituted a six months course in

obstetrics for registered nurses with proper educational qualification to fit them for missionary work in country districts, in the hope that they may serve as instructors and advisors to expectant mothers in thinly settled regions; there also remains the great obligation of providing time and facilities for original work to the large number of volunteer workers in the department, who have a right to expect such recognition for their unselfish devotion to the cause of medical education and research

440 NORTH NEWSTEAD AVE.

DISCUSSION.

DR. HERMAN E. HAYD, Buffalo, New York.—It is unusual to have a paper of this kind presented before this Association. It has been very interesting and instructive to us, and I agree with our president, Dr. Pantzer, that this is what we hope to come to, and from what Dr. Schwarz has stated you can see what a wonderful institution he has in St. Louis. He evidently keeps in touch with people who are inspired with the right kind of feeling for humanity.

LYMPH GLAND EXTRACT. ITS PREPARATION AND THERAPEUTIC ACTION.*

BY

DAVID HADDEN, M. D., F. A. C. S.,

Oakland, Cal.

THE *Archives of Internal Medicine* for July, 1914, contained a paper by Dr. R. A. Archibald and Dr. Gertrude Moore entitled: "A Preliminary Report on the Production, Action and Therapeutic Effect of Leukocytic Extracts."

The leukocytic extract referred to in this article is prepared by a digestive process from healthy leukocytes. It differs from that obtained from inflammatory leukocytes by the method of Hiss and Zinser, in that it is of much more condensed bulk, is more stable and dependable, of far greater efficiency and very reasonable in cost. In the majority of cases, a subcutaneous injection of 2 c.c. gives, after a short interval, a marked increase in the multinuclear leukocytes. This leukocytosis reaches its height in about eight hours. If given intravenously, the height of the leukocytosis is reached in about three hours, though the effect obtained is more transient.

There is no sensitizing of the patient, nor have we noticed any objectionable symptoms. When used in acute septic conditions,

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with a high leukocytosis, the phenomenon produced is one of steady and gradual decrease, with rapid amelioration of all symptoms.

For some time preceding the publication of Dr. Archibald's and Dr. Moore's paper, the use of the Archibald-Moore leukocytic extract has been a matter of almost a routine in my surgical cases of septic origin; and by my associates, it is largely used in all types of infection. In my practice, the cases of acute septic appendicitis, especially, have run a much more rapid convalescence, and, as a rule, are completely healed within two weeks.

I feel justified in stating that in the majority of all septic cases, in my practice, the severity of the attack has been decreased and the rapidity of convalescence increased.

We have used in several cases of streptococcemia the magnesium sulphate solution advocated by Harrar. The magnesium sulphate solution alone produced no leukocytosis, but used in conjunction with leukocytic extract, a marked leukocytosis resulted of a more profound character than the extract alone produced. These patients recovered.

About three years ago, Dr. Archibald and Dr. Moore began experimental work with a lymph gland extract. The technic of the preparation follows much the same method used in the production of the leukocytic extract, and is as follows:

"Lymph glands are obtained from healthy bovines, ground, diluted with sterile distilled water and exposed to a temperature of 58° C. for one hour. They are then placed in the incubator at 37° C. and autodigestion is allowed to proceed until a definite amount of digestion has taken place. The point at which digestion is stopped is arbitrarily fixed by the blood pictures produced in guinea-pigs and other experimental animals including humans.

"When digestion has proceeded to what it is deemed the proper stage, a preservative is added, the preparation is filtered first through filter-paper and then through a number one Berkefeld filter, following which it is tested physiologically, bacteriologically and chemically. Any extract so produced that does not show definite blood changes when injected into experimental animals, is discarded. In other words, if an extract does not produce over 100 per cent. increase in the total leukocyte count and a corresponding increase in the mononuclear leukocytes, it is abandoned."

In the preparation of both the leukocytic and lymph extracts, there is a period of digestion reached at which point the maximum therapeutic effect is obtained. It has been found much easier to determine the necessary degree of digestion in the case of lymph gland extracts, because of the relative constant cellular content of

the glands used. In dealing with blood, the cellular content naturally varies with the stages of the physiological functions in progress in the animal, so there is no easy way, at present, to determine the proper time to discontinue incubation. The correct stage is reached by withdrawing a proportion of each batch at stated intervals and testing out the separated portions on guinea-pigs. In case the preparation does not come up to a certain standard, that batch is discarded. Digestion carried beyond a definite point will always result in a complete loss of physiological action in both the leukocytic and lymph extracts. In the lymph gland preparation the time element of digestion can be depended upon. Both preparations are required to give 100 per cent. increase in the total leukocyte count.

That the physiological effects of the leukocytic and the lymph gland extracts are not due to the protein content is evident from the fact that a 2 c.c. injection contains less than 0.04 of 1 per cent. of protein. It takes twenty times as much protein as each dose contains to produce any changes in the blood picture in the guinea-pig.

While the leukocytic extract produces a marked increase in the polymorphonuclear leukocytes, the lymph extract invariably produces an increase in the lymphocytes, especially the small lymphocytes, and the blood platelets.

The effect of the blood platelets increase is a rapid and marked increase in the coagulation power of the recipient's blood. In guinea-pigs used for standardization, one injection produces such a decrease in coagulation time as to make difficult the blood countings through the almost immediate solidification.

We have found that in normal human beings the coagulation time is markedly decreased with the first dose. Cases with abnormally slow coagulation time show marked results, even following the primary injection, though, as a rule, a dose for three succeeding days produces the greatest effect, therapeutically. The period may be reduced to even ten seconds and this effect will persist for three or four days.

One case presenting severe uterine bleeding, in which the pelvic pathology had been corrected, had a delayed coagulation time. The bleeding in this patient was not influenced by any of the drugs producing contraction of the uterine muscle, but in time an improvement resulted from prolonged antispecific medication instituted upon finding a 60 per cent. positive Wassermann. This patient's coagulation time was fifteen minutes by the capillary tube method. She repeatedly presented the phenomenon of a sudden cessation of bleeding within fifteen minutes of the initial lymph gland extract

injection at each menstrual period. Within twelve hours the flow would again appear in moderate amount. The menstruation was kept within normal limits with a daily dose for three successive days. Several times a premenstrual treatment of three doses was instituted and no excessive bleeding occurred. The only subjective symptom this patient ever noticed following the injections was a "board-like feeling of the head" as she expressed it. The objective sign present was the prominent appearance of the cervical and facial veins for about half an hour, but with no increase in blood pressure.

I have used the lymph gland extract in a number of cases of similar nature where the bleeding was due to slow coagulation time of unknown origin. The pelvic organs were free from abnormality or had abnormalities not accountable for hemorrhage.

Two cases of easy bleeders, one with hemorrhage from the abdominal incision, the other with free oozing from the mucous membrane, had a complete and permanent cessation of the bleeding almost immediately following the one dose.

I have been interested in the fact that in some cases an aphrodisiac effect followed a series of injections, and so have tried it in a few cases of sterility, but so far I cannot express an opinion.

My associates have been using this lymph gland extract in cases of hemophilia, pulmonary hemorrhage and tonsillar bleedings with very favorable results. It has replaced, in our hands, horse serum and fresh blood, and by two men is used as a prerequisite to tonsil operations. In operations done preceding or during the periods, or cases in which much oozing is to be expected, I use it as a preparatory injection, given twelve hours or so before operation or immediately following operation if I fear any possibility of excessive oozing. I am rather inclined to feel that while the functions of certain glands are stimulated, the exudate from serous surfaces is diminished.

In another class of cases I have used the lymph gland extract rather extensively, but these cases are of the type that make it difficult to speak with authority as to the therapeutic results.

About eighteen months ago, having in mind the infectious granulomata theory of sarcoma, I reasoned that the character of the tissue involvement might more readily be influenced by a therapeutic agent that would increase the lymphocytes, so I began the use of the extract in a case of tumor of the cecum responding to the Abderhalden test for sarcoma. This patient, when first seen, had an excessively tender mass in the right iliac region, so much tenderness being present that she could not even turn over in bed without supporting the side. A daily injection of 2 c.c. for about a period of ten

days resulted in a marked increase in the size of the tumor and a disappearance of all tenderness. After about twelve doses she complained of some headache, and at her request, the injections were discontinued. Seeing the case only as a consultant, conditions arose which prevented further administration.

Naturally, the treatment of any malignant growth by such measures resolves itself into two methods of application: One as a prophylactic following surgical removal; the other as a palliative in the cases of inoperable type. The first method naturally can give us no immediate information as to the value of the therapeutic measures employed. In the cases of inoperable type, the notorious tendency of all malignant growths to periods of lessened rapidity of growth, and improvement of symptoms lays one open to the liability of crediting temporary improvement to the type of medication used.

I have used, during the last two years, lymph gland extract in all inoperable cases of carcinoma, and discounting fully the possibilities of spontaneous improvement, I believe I am justified in the conclusion that the effects have warranted the use of the extract.

The patients themselves have in most cases acknowledged that they felt stronger and in better spirits, and, as a rule, were eager to have the injections continued. In most cases the growth has decreased somewhat in size, and any associated inflammatory overgrowth has subsided.

Upon one case of carcinoma of the pylorus with practically complete obstruction, I did a posterior gastroenterostomy. This patient has lived one year, eight months of which was given to active physical labor. The operation showed all the mesenteric glands extensively involved, the original tumor mass being the size of a large orange. The growth decreased more rapidly in size than could reasonably be expected as a result of the adventitious opening, so that for months it was barely palpable even through thin abdominal walls. Periods of considerable length intervened from time to time in which the injections were discontinued as the patient was away from home, and even though he carried the extract with him, neglected its use. During these intervals, the growth increased in size and the stomach symptoms became evident. The increase of weight from 90 to 142 pounds can, of course, be accounted for by the ability to take food.

This case is typical of several others of similar type in which improvement seemed to be definitely associated with the periods of treatments.

Dr. R. S. Leachman of Vallejo, California, reported to me the results in one case of inoperable pelvic carcinoma in which, at my

suggestion, he had used the extract. This case had an exploratory incision done a short time before the lymph gland extract was begun and it was found that the bladder, uterus and rectum were involved. The bladder and rectal symptoms were extreme, and the loss of blood marked.

Dr. Leachman reports "that the bleeding promptly decreased and during the last three weeks of the illness completely disappeared. The size of the mass decreased fully one-third."

"I am convinced," he says, "that the lymph gland extract did help the patient locally very much. Pain was less and pus and blood entirely relieved. The family also think the relief was marked."

The dose has been fixed by Dr. Archibald and Dr. Moore at 2 c.c. daily, because of the character and definiteness of the blood change resulting. I have, however, been using it in cancer cases as freely as 10 c.c. daily. In some cases the 10 c.c. dose produced some headache and restlessness, so that recourse was had to 4 c.c. twice daily with no untoward symptoms resulting. We did not find that the blood changes varied in any marked degree over those produced by a 1-ampule dose. There was no evidence in any case of protein reactions or sensitization of the patients.

While with me the use of the lymph gland extract in malignancy has been entirely theoretical, the work of the late Dr. J. B. Murphy, of Chicago, would give one some basis of fact and with his work in mind we hope shortly to take up the laboratory experimental work on animal tumors.

Accurate work on the influence of these body extracts upon ovulation ought to be possible on account of the work the University of California Anatomy Department is doing in the determination of the exact ovulation cycle in rodents.

We probably will never use body extracts in operable cases of malignancy as a substitution for operation, but if proven of value in animal work, it will have its place as a prophylactic. In inoperable cases, it gives us one method that undoubtedly prolongs the patient's life and relieves many of the distressing symptoms, so that the amount of opiates necessary is lessened, but above all it puts in our hands an ability to make the patients really feel something is being done for them.

The present important field for the lymph gland extract is, however, undoubtedly in cases of hemorrhage, and especially so in patients whose blood changes result in lowered coagulability.

Dr. Archibald and Dr. Moore are anxious to see the extract tried out more extensively in tuberculosis and other chronic infections for

they feel that their laboratory experimental work has demonstrated its effect in these cases.

2716 TELEGRAPH AVENUE.

DISCUSSION.

DR. JAMES E. DAVIS, Detroit, Michigan.—I would like to ask Dr. Hadden what his theories are in regard to the chemistry of the platelets, and in using the lymph gland extract just how these platelets are produced. I believe we have a number of theories. Some have believed that the platelets have nothing whatever to do with the coagulation. Others have brought up a discussion as to just what the platelets are. Are they fragmentary portions of the lymphocytes? This is an interesting line of speculation, and I wonder whether light has come to Dr. Hadden in these particular instances of the platelets.

DR. DICKINSON.—I would like to know how many cases he had investigated before he came to these conclusions?

DR. HADDEN.—Personally, I cannot express any opinion as regards the function of the blood platelets. However, they are so markedly increased, that much of the space in between cells is filled up with them and we have assumed that they are the cause of the decreased coagulation time. Dr. Moore feels she has proven conclusively, although as yet unwilling to accept this evidence absolutely, that we are dealing with an enzyme and that the presence of this enzyme produces these changes.

While I was in Rochester, Minnesota, I had an interesting talk with Dr. Luden and Dr. Kendall on the chemistry of the thyroid and the probable chemistry of this extract, and they felt we were dealing with an enzyme.

So far as the number of cases is concerned, I will say that I have used this extract in six cases of inoperable carcinoma and sarcoma of the abdomen. In malignancy I have not tried it outside of that field.

Thanks to Dr. Moore and Dr. Archibald, I have with me some of the lymph gland extract, and if any of you wish to try it I shall be glad to give it to you, also if any of you care to take up any experimental work, Dr. Moore and Dr. Archibald will gladly supply you with what you need.

OBSERVATIONS ON BLOOD PRESSURES DURING
OPERATIONS.*

BY

CHAS. W. MOOTS, M. D.,

Toledo, Ohio.

(With two illustrations.)

It has been a custom of mine, when visiting various clinics, to obtain from those in charge their ideas of blood pressure. For a number of years this subject has appealed to me as one of great importance and interest. During this time of study and observation, I have been greatly aided by close association with Dr. Stone, who has already brought the matter to the attention of the profession by well-written articles; also by my anesthetist (Dr. McKesson) who has charted for myself and other surgeons more than eight thousand cases, taking the blood pressures, pulse and respiration every few minutes during each operation.

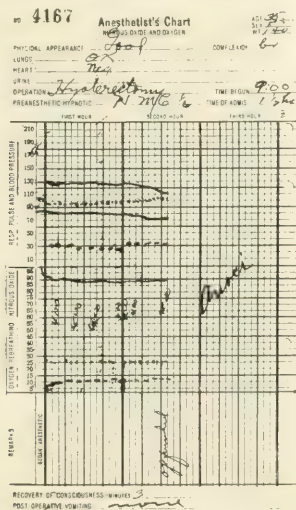
There is one point with which I am always deeply impressed, after observing the attempts to record pressures at different clinics, and that is this: There seems to be an utter lack of uniformity of technic in taking the readings as well as inability to interpret the readings taken. At some of the most renowned teaching centers we have been much surprised to note that readings were taken only of the systolic pressure, and this by individuals whose lack of professional training prohibited all possibility of any intelligent idea of myocardial, endocardial, or vascular changes, or the relation of these changes to pressures. It has seemed to me, therefore, that it might not be a waste of time for this association to consider certain aspects of this subject, and I make bold to start with a more or less elementary, yet what I believe to be a necessary, discussion of the different pressures which we have found to be important. In this discussion, I purposely omit reference to the effect of respiration and pulse rate on the pressures in order to avoid confusion.

Diastolic Pressure.—This may be defined as the pressure existing in the artery under observation during the diastolic pause just preceding the succeeding cardiac systole. Taken alone, it is the truest index of the arterial tension. No matter what the systolic pressure may be, if the diastolic is high, there is a true hypertension of the vessels; and conversely, if the diastolic is low, we are dealing with hypotension, and this is true irrespective of the systolic pressure.

*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

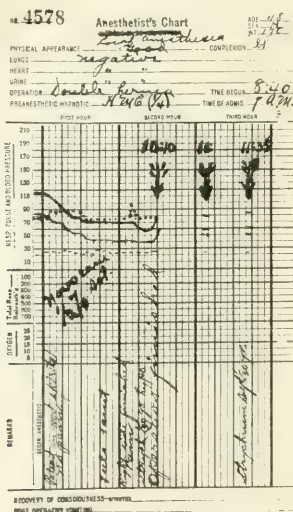
Pulse Pressure.—This is defined as the force necessary to move the column of blood in the artery. It represents the force exerted by the contracting ventricles in excess of the diastolic pressure.

Systolic Pressure.—This is the sumtotal of pressures existing in the artery under observation during cardiac systole. In other words, it represents the diastolic pressure plus the pulse pressure, and shows the energy being expended by the myocardium at a given



The Pressure Ratio.—Briefly stated, I mean by pressure ratio, the percentage obtained by dividing the pulse pressure by the diastolic pressure. Take the systolic and diastolic pressure, and then find their difference which will be the pulse pressure. You then have simply the following problem: "What percentage is the pulse pressure of the diastolic pressure?"

For example, let us assume that a normal case has a systolic pressure of 120 mm. and a diastolic of 80 mm. The pulse pressure is



normal between the limits 40 and 60 per cent. If your case has vascular contraction and rigidity, as shown by a high diastolic pressure, but has a compensating heart that is pushing the blood to the periphery, as shown by a corresponding rise in the systolic, so that the pulse pressure remains near the 50 per cent. ratio to the diastolic, you need have no fear in proceeding with a needed surgical operation. If, however, the pressure ratio is low, say 20 per cent., and taking into consideration the probable presence of acidosis or other toxemia, it is wise to offer a grave prognosis. On the other hand, if the pressure ratio is greater than 80 per cent., the prognosis is at least equally grave, as one may look for little cardiac reserve force because of overwork already done so that slight shock becomes very grave.

Technic.—I think it is now generally conceded that the auscultatory method should entirely supplant the palpatory. We have used the former method exclusively for the past six years and find it quite satisfactory.

The diastolic pressure especially is much more readily obtained by this method.

We have our apparatus so arranged that it is an easy matter for Dr. McKesson to keep his own records while giving the nitrous oxid-oxygen, which is our routine anesthetic. The reading dial, which is 8 inches in diameter in order to render it the more easily observed, is placed on a stand which also contains record sheets. The stand is immediately to his right and answers for a writing desk. By having the rubber tubes of sufficient length to connect the reading dial with the arm band, and the Bowl's stethoscope over the brachial artery to the ear pieces, he has no difficulty in making the frequent observations which we believe to be most important, and which offers the earliest symptoms of trouble. By using this "barometer" we are able to forecast the approaching storm long before it can be determined by any other method and thus get our boat to shelter. Everyone here knows how notoriously inefficient is the treatment of shock when once profoundly established, and if anything is to be done it must be recognized and the proper course instituted before the heart is exhausted by rapid contractions in its attempt to hold up the blood pressures. "Unvariable pressures during operations are the result of most painstaking technic on the part of the surgeon, anesthetist, and every one concerned in carrying out a shock-free technic. Such results cannot be obtained by accident, but it is necessary to eliminate certain procedures peculiar to the individual surgeon and anesthetist, which by means of proper

blood pressure readings are found to be frequently productive of more or less disastrous results either at the time, or during the few days succeeding the operation. For example, no surgeon is willing to admit that he is rough in the belly, and no anesthetist rushes into print with the admission that he generally overdoses his patients, but a series of cases where the blood pressures are frequently taken in each case, will commend or condemn their technic most emphatically. If circulatory depression frequently occurs, even in minor degree, it is due to faulty technic and the cause should be discovered and removed; it may necessitate an entirely new technic in several particulars" (McKesson).

Having made observations and records of the pressures in 98 per cent. of our cases for the past eight years, we have, as a result of our experience alone, come to certain conclusions which I wish to offer at this time.

1. The systolic pressure alone is of very slight, if any, value.
2. The diastolic pressure alone is of much more value than the systolic alone.
3. The pressure ratio is the essential factor, and offers the earliest danger signal.
4. There are certain elements in technic which have marked and constant effect upon the pressures. These are as follows:
 - (a) The psychical or emotional state of the patient.
 - (b) The position of the patient upon the table, the extreme Trendelenburg being the worst.
 - (c) Overdosing by the anesthetist.
 - (d) The amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with scissors, the hands, and other dull instruments; the packing of large gauze packs, instead of rubber tissue, into the abdominal cavity.
 - (e) The preservation of the fluids in the body up to the hour of the operation, this being absolutely necessary to maintain the usual pressures.

THE NICHOLAS.

DISCUSSION.

DR. R. R. HUGGINS, Pittsburgh, Pa.—I regard this paper as one of the most important contributions that we have heard at this meeting. It leads the way to a final solution of the current estimate of a patient's resistance previous to operation. Our studies have led to the conclusion that the changes in pulse pressure which occur in an impaired circulatory apparatus after exercise are most important aids in the determination of the strength of the heart muscle. I am glad to have heard this conclusion because we have

been quite confident that it is true for some time. Patients with either extremely high or low blood pressure may be very poor risks. For several years we have been using spinal anesthesia. I have often been asked for an excuse in its use. It is this. There is no form of anesthesia which will conserve as much energy as spinal. The heart is given absolute rest throughout the anesthesia. The whole splanchnic area is put out of commission and most of the blood lies quiet in the large vessels of the abdomen. Instead of heart strain which is produced by all forms of inhalation anesthesia, there is the most profound rest that may be given to that organ.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I want to commend the work of Dr. Moots in calling our attention to the great value of knowing the blood pressure. If you have a patient with a blood pressure of 170 or 200, it is dangerous to operate. The same holds true with a patient who has an abnormally low blood pressure. It is dangerous to operate until the blood pressure is raised.

I am glad he has emphasized the question of local anesthesia and also the mental viewpoint of the patient. Patients who are exceedingly nervous have blood pressure run up on the slightest provocation. It is very essential to get these patients as quiet as possible, and in the morning, when you operate, you want to keep them busy, and by the time they are ready to be taken to the operating room give them $\frac{1}{4}$ grain of morphin, with $\frac{1}{120}$ grain of atropin. This, when given twenty minutes before operation, has a wonderful effect in stimulating them. It gives them courage. It is like a good drink of whiskey, it stimulates a man to fight. These little things count in connection with our work. If we take the pulse pressure during the anesthetic we will have less trouble than we have previously had in these peculiar cases that are on the border line.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—It is a sad comment on surgery as we know it to be, not the surgery of the men in this Association, but surgery as it exists to-day, when cases are brought into sanatoria and hospitals with dubious superficial diagnoses, hastened to the operating room and carried through without sufficient after-watching and care.

I am glad that we have had a paper, not on the technic of operation, but one on searching out the vitality of patients before operation. I wish we could know just where the doctor obtains his apparatus, and all about it, so that we may apply it in our own clinics. There are many blood-pressure machines on the market, and much has been incompetently written from a laboratory standpoint, but we can no more comprehend some of the books on blood pressure than we can our books on bacteriology, because we know little or nothing about technic or culturing. We should have this thing made practical to carry home and use to advantage.

I am very glad to have heard from the doctor and hope he will speak again so that we will be able to gather more important points.

DR. MORTS (closing).—I am certainly not unappreciative of the kind remarks that have been given me on this paper. I assure you, gentlemen, it has covered an experience of about ten years of pretty

hard work. I only hope that I have inspired each of you men, every one of you, to go home with the determination of taking advantage of this means which I believe to be the best criterion to measure a patient's resisting power. I have saved a number of lives by shortening the operation at the suggestion of my anesthetist. I hope that we will quit talking about systolic blood pressure alone; it is of very little importance taken alone. However, the *pressure ratio* is exceedingly important from the standpoint of the surgeon.

As to the apparatus, it simply consists of a bulb, and you may use the ordinary Tycos dial instead of the large one, and have the rubber tubes long enough to run from the patient's arm back to the anesthetist and have a Bowl's stethoscope disc fastened to the brachial artery with an elastic band.

DR. SCHWARZ.—Where do you get these large dials?

DR. MOOTS.—I cannot tell you, but these dials have no advantage over the ordinary Tycos dial, except the readings are somewhat simplified. Dr. McKesson can furnish all information concerning their purchase.

DR. DICKINSON.—We cannot have a specialist, at all times, to give an anesthetic. The intern must be trained, and the patient watched, and he should attend to the patient and to the anesthesia.

DR. MOOTS.—I am rather optimistic. I believe the average intern to-day knows more about blood pressure than any of us did ten years ago, and I believe you will find the average intern very much interested in taking blood pressures. It is unfortunate if you are compelled to depend for an anesthetist on the family physician who comes in to see that everything goes right. It is equally unfortunate that you are compelled to rely on a nurse as an anesthetist, unless she has been properly trained in medicine, for with her elementary training she cannot comprehend blood pressure in all its relations. I wish to announce that we have just completed a technic by means of which we are measuring the patient's acidosis during the operation, and I hope if we can get a sufficient number of cases upon which to make observations during the next year, I may have something to tell you about our results.

POINTS IN THE DIAGNOSIS OF PELVIC TROUBLES.*

BY

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THE difficulties in making a correct diagnosis of pelvic troubles we all recognize. Let us take the ordinary disturbances of menstruation. To make a correct diagnosis of amenorrhea, for instance, will embrace the whole domain of physiology, pathology, and bacteri-

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ology. Amenorrhea can be caused by many physiological disturbances, and almost all bacterial infections, as well as innumerable diseases. If we consider dysmenorrhea, it is by no means a local disease, or a question of mechanics, as its diagnosis will embrace all domains of neurology and hematology. And when it comes to menorrhagia, we find that many cases are constitutional and not local. So that in this one phase of the question, that is the menstrual function, we must cover nearly the whole domain of medicine, and it shows that the gynecologist must have a broad view and understanding of the practice of medicine.

If we now consider other pathological lesions, we often find great difficulties in the differential diagnosis of swellings, tumors, etc. The diagnosis of fibroid tumors is ordinarily easy; but the diagnosis of small uterine fibromata of the submucous variety, causing menorrhagia and leukorrhea, is not very easy, as these tumors remain small for months and years, and can only be detected with great difficulty. A dilatation of the uterus must be made in suspicious cases. This cannot be readily done with steel dilators under an anesthetic, as the uterus must be explored by the finger. In these cases it is best to use a sponge tent, perhaps a succession of tents, so that the cervix is perfectly soft and the uterus can be readily and thoroughly explored with the finger.

Take, again, women in the so-called cancer age, who are suffering from rather profuse hemorrhage, or perhaps some little discharge, we must suspect a development of cancer, and are obliged to curette and examine the tissue microscopically. During the cureting it is easy to miss little cancerous points the size of a pea in one horn of the uterus; and then we are lulled into the belief that no cancer exists. In these very cases we have brilliant results with early vaginal hysterectomy. Then, again, how easy it is to overlook small polypi in a uterus of about normal size and with a normal cervix, unless we dilate and explore the inside of this organ.

Take a case of pregnancy complicating uterine fibroids. How difficult it is, sometimes, to recognize both conditions, and how necessary it is to make the diagnosis before operative procedures are instituted. Take a case of ordinary ovarian tumor; how easy the diagnosis generally is; and still, how difficult when you have encysted peritonitis of a tuberculous nature.

It is difficult to differentiate an ovarian tumor which follows peritonitis which has produced adhesions between the ovary and tube on one side and where a tumor develops on the other side of the abdomen. You see the case first when the tumor has reached

the lower costal margin, and then you do not know whether you are dealing with a hypernephroma, a hydatid cyst of the liver, or a cyst of the spleen on the other side. The vague history you get from the ignorant patient does not help you much.

Take the solid tumors of the ovary, benign or malignant, when they become adherent to the pelvis, the uterus, and the rectum, it is almost impossible to make a correct diagnosis before operation. In fact, after the tumor is out, pathologists cannot always agree upon what is the character of the tumor.

Let us now take up pelvic inflammations, whether puerperal or specific in origin. How difficult is it to determine whether it is a tube adherent either in the cul-de-sac or to one side of it; or whether it is adherent to the side of the bladder or the fundus of the uterus; or whether it is an abscess which has developed along the lymph channels in the cellular tissue, extraperitoneally, working its way down toward the rectum or up in the direction of Poupart's ligament, or back to the crest of the ilium. We recognize the infection, but it is difficult to locate it. When the exudate accumulates in the cul-de-sac the case is easy enough; it makes no difference what it is if we open and drain in this region; but, if it is higher up, not within easy reach and more to one side, an abdominal section becomes necessary, which always has a greater mortality. Still in some cases a prompt operation is imperative, while in other instances it is better to wait until the best point of attack has developed. In these cases the history and the symptoms will often enable us to make a correct diagnosis, and thus avoid error.

Take cases of sterility, where we can detect nothing abnormal even with a good history, how often patients lie to lead us astray. Patients who have had pelvic troubles and adhesions; closure of the tubes, that we cannot detect by ordinary examinations; and, if in doubt, are obliged to make an exploratory celiotomy to find the cause of the trouble and remedy it at the same time. But, before doing this, how necessary it is to ascertain whether the husband is really potent.

The cirrhotic ovary causes a lot of trouble; severe pain, especially during the menstrual period, and still a physical examination will reveal nothing. Sometimes we can feel even a small ovary; but, when the patient is very fleshy, which is usually the case, it is very difficult.

But the most difficult of all, it seems to me, are cases of pelvic adhesions in women suffering and complaining, and still nothing can be detected. Physical examination indicates everything is in

its place. But these patients have pain when standing, and when doing light work, at defecation, or when a little gas distends the intestines. Some of them are very much distressed. I find that, on careful physical examination, these patients have pains when I move the uterus and the pelvic organs in certain directions. If the uterus is pushed to the right, they complain of severe pain in the left side; or when pushed in the opposite direction they have pain on right side. When the uterus is pulled away from the bladder, no complaint is made; but when the uterus is pulled forward, away from the rectum, severe pain is complained of, especially in the back. The pains in these cases I find are due to adhesions; and I believe the adhesions are caused by an infection emanating from the rectum and sigmoid. These patients often suffer from chronic constipation. They are, certainly, the most difficult cases to manage. All the douches, tampons, administration of alteratives, etc., have been of little benefit in my experience. Abdominal section alone, and mechanical means will enable us to remove the adhesions.

In many instances it is difficult to convince the patients that an operation is necessary, because they have always been in seemingly perfect health and never had any symptoms of a pelvic disease until, perhaps, three or four years previous. The trouble since then has gradually increased in severity, so that now the patient has great difficulty in working, walking, and following her usual vocation. I am convinced that there are many such cases where the history is perfectly free from the non-existence of any trouble previously, with a gradual onset of pain and distress, which is very much increased when moving the uterus and the pelvic organs as described above. I would like very much to hear the experience of others on the subject.

In conclusion, I would say: *First.*—Naturally, all pelvic troubles offer difficulties in diagnosis. *Second.*—Adhesions of some of the pelvic organs without menstrual disturbances or palpable changes are very difficult to diagnosticate. *Third.*—Pain on moving the uterus or any of the pelvic organs indicates adhesions. *Fourth.*—These adhesions are probably caused by infection from the bowels. *Fifth.*—These obscure cases require exploratory celiotomy for exact diagnosis and efficient treatment.

CONSIDERATIONS IN THE CARE OF OUR PATIENTS
BEFORE AND AFTER OPERATION.*

BY

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THERE is nothing new in dealing with this threadbare subject, but the author hopes to arouse some interest and perhaps some discussion upon a theme which still needs it.

First of all, I wish to make the patient and her interests paramount; and to that end let us deal with her as we would with a woman and a mother, rather than the case in *Ward No. 2, with uterine prolapse*. Let us have not so much of the routine, but more specific care for a specific case; let us adapt our resources and environment to her, instead of demanding her compliance alone to ours. Patients need more personal attention from the surgeon and less physic and digitalis from the hospital intern. Too much time has been given alone to questions of bare mortality and too little to morbidity, and to the causes of delayed restoration to the normal. We should not alone be interested in the cure of disease and saving of life, but likewise in the relief of pain and psychic influences, consequents upon operation and hospital environment.

Every surgeon should be a humanitarian. Surgery is a thing of art as well as science; a thing needing a fine esthetic sense rather than mere boldness. It is constructive, not destructive; it is saving life, not taking it, and likewise a surgeon is not he who has boldness, but one who has judgment; not alone he who knows how and when to operate, but also he who knows when to refrain and when to conserve. Crile's microphotographs of the brain cells taken before and after operation, before and after long anesthesia, pain, fear, excitement and exertion, certainly show that each one of the factors has a large part in the recovery of our patients, and should point the way, first of all, to the better preparation before operation.

Elective operations are those which are not strictly emergency operations; they are largely in the majority. We usually have the opportunity of choice, where, when and how the patient should be operated upon, and just here I should say too, that a considerable

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number of patients of the true neurasthenic class have been submitted to operation too frequently. Unless she has a definite demonstrable pathology, she should not be considered an operative risk. Many deaths that might have been avoided, have occurred in these patients of low resistance. Those affected by an early Graves' disease, where the thyroid enlargement is not yet apparent, and many children also, who have status lymphaticus, should be eliminated from operative consideration, unless forced upon us through some emergency.

Surgeons have paid too little attention to the internal secretions. Patients do not come to us for operations *per se*, they come to be cured of a malady of which they usually know nothing, and place themselves in our hands, because they have been referred to us by some other physician, who has failed to cure them. We should be exceedingly careful in the selection of such cases. As a rule, they are not given thorough examination—general physical examination, I mean. Every patient should have it. Some of our internist friends are as lazy as we and have not made thorough examination before referring the patient. I am well convinced that the majority of those diagnoses which are not made or are improperly made, are not because of lack of knowledge, but lack of time and proper application; therefore, we see a certain number of patients each year, sent to us for operation, who do not need it, or come at a time when they are poorly prepared for it. Then we have the other class which has definite pathology, which has or has not been diagnosticated before coming—the white-faced emaciated ones, who need rest in bed, rather than the wash-board and scrubbing that have been their wont. The patient needs good food, tonics, rest, etc., before an operation is contemplated. A short time in the hospital for general treatment, adaptability to the new environment, knowledge of the surgeon's personal care of her, and the assurance that she will make an early recovery, certainly have their good results.

PREOPERATIVE CARE.

In general, we have been giving all our patients more preoperative care than formerly, and less rushing to the hospital and hurried operation. For two or three days, we feed them well on easily digested nutritious foods; the last day we give 6 ounces of water each hour while awake; this fills the blood-vessels, increases kidney, liver and skin excretions and secretions. Nervousness and loss of sleep are exhausting, and should be met by such remedies as the usual sedatives

or opium. I think it imperative that the patient be given sufficient quantities of opium to induce sleep. A patient who is permitted to lie awake all night to meet perhaps one of the crises of her life the following day, is in poor condition to put up the necessary defense. We would not care for a team of plow horses that way, if we expected a full day's work from them on the morrow. We teach our nurses to be cheerful to our patients, and perhaps we also act in accord with them, but how little that interests the woman or man who has lain awake for two nights, thinking of operations or perhaps "the great divide."

As to clearing out the alimentary canal, we are heartily in accord with Doctor Baldwin. The patients should be given an active cathartic twenty-four hours or more before the operation. Castor oil is without question, we believe, best, since it sweeps out the entire bowel, producing a minimum of griping, and its action is complete before the night comes on, when we may need to administer opium for sleep. Unless the patient is to have a rectal operation, enemata of any description on the morning of the operation are contra-indicated. What we want is intestinal rest. Enemata produce retroperistalsis, and it is often many hours after one is given before the last part of it is expelled. In our hands, this preoperative treatment has been indescribably better than the old days of compound cathartics and injections.

On opening the abdomen, the intestines are found empty and asleep, and I believe this is a decided prophylactic to later abdominal distention. We are convinced that our cases have been more comfortable in their early convalescence, and have yet to see the first case in which we regretted not having given an enema. One hour before the operation, a small dose of morphine and hyoscin is given subcutaneously; less mucus is secreted in the throat and trachea, and the patient takes less anesthetic. In general, we like gas and oxygen, combined with a little ether; it is less discomforting to the patient, followed by little or no nausea and vomiting; lessened thirst and immediate return to consciousness. It is an unusual thing to have the pulse affected by even long administration. At our hospital, we employ a skilled anesthetist, one who has prepared herself by many months' application in the technic of gas administration. Gas is dangerous in the hands of a novice, so is ether, so is chloroform.

All operative cases, especially abdominal ones, should have the benefit of laboratory findings. Our plan of attack has often been changed after we have reviewed these reports. Many operators think lightly of the reports from the laboratory; we feel that they

are one of our instruments of precision, and while we do not let them outweigh all else, still the laboratory has its definite place; it is indispensable, and when we become negligent in asking for all it can give us, we often find it to our disadvantage. This is particularly true in reference to blood findings.

OPERATIVE CARE.

The pendulum swings in surgery as in everything else. The thing we adopted yesterday we condemn to-day. So much for progress.

As regards abdominal surgery, we have learned that the viscera and their coverings speak in no uncertain manner, and to some extent we have learned their language, and, therefore, after an operation, some of them cry out by expressions of pain; some by way of abdominal distention; some by way of vomiting; some by thirst; some by pallid skin and sunken eyes; but the meaning of it all is, that we have given insult. One's insides were never intended to play ball in; but if, perchance, the ball has gotten in, our duty is to get it out as quickly as we can, with gentleness and safety. We have been taught by this language, that we must get in and get out; that we must make openings large enough to see that which we cannot feel; that we must do the least handling possible to accomplish results; that we should avoid forcible retractions, and when we seek to pick up bleeding points, pick them up separately, instead of insulting all the adjacent tissues; that warm moist gauze, used gently, is less offensive than dry gauze, used roughly. In brief, if one desires to tame a vicious animal, don't try to do it by way of teasing him. Permitting the intestines to be exposed to the air more than absolutely necessary, or to have them come in contact with the abdominal wall which has been prepared with iodine, to make traction upon the mesentery; to permit too many hands in the operating wound, all these and many more are certain factors in the production of that symptom-complex, we call shock.

During the last two years, since we have been giving more attention to preoperative care, and handling other peoples' intestines as we would like to have them handle ours when needs be, the factor of shock has been singularly absent. I heard Doctor Mayo once say, that anyone who would take advantage of their patients merely because they were asleep, and would pinch, pull and rub their exposed tissues needlessly, is a coward and a knave. I am convinced that surgeons are careless of nerve endings and splanchnic stimula-

tion, beyond what they would be were the patient conscious. Of all men who should be gentle and careful in the process of his work, it is the surgeon. It is well to know what shock is; to combat it when present, but how much better to be able to avoid it.

POSTOPERATIVE CARE.

The handling of patients should vary in accordance with their psychology and the nature and severity of the operation. In all operations of gravity, we use the Murphy drip, with bicarbonate of soda and glucose, as soon as the patient is returned to her bed. The soda will overcome the tendency to acidosis, the glucose furnishes an easily absorbable carbohydrate, and thus supplies energy. In those who through accident lose much blood or who sweat profusely, the giving of two pints or more of this solution, relieves the distress of extreme thirst, and overcomes tendency to shock. This is a harmless measure, giving little discomfort to the patient, and supplies her with water and food when her tissues have need of it. If the presence of a small rectal tube is annoying to a nervous patient, we then give 4 to 6 ounces of the same solution at one time, at intervals of three hours. We think this is a most valuable remedy, especially when administered early; thirst is not so severe, and the secretory organs, which are inhibited by long anesthesia, are made active. We desire to get liquids and food into our patients as soon as consistent with the circumstances. Thirst and nausea are disturbing factors, and when our patients call for water, we usually permit, in small quantities frequently repeated, hot tea or hot water, after the first two or three hours. If this is returned, then she is given as large a drink as she can be induced to take, and when this is returned, all liquids are prohibited by the mouth, until she is free from nausea. A stomach tube is seldom necessary, but occasionally becomes a valuable instrument in severe cases. Medication by the mouth has been found useless. Severe and long-continued nausea is sometimes relieved by a 3-grain opium suppository, repeated if necessary, until the stomach has been put at rest for a few hours. In our experience, it has acted better than morphine or codein for this purpose, especially so when the operation has been pelvic. I think some of these patients by the distressing experience of continued nausea and vomiting, become nervous and hysterical, and a dose of chloral and bromide per rectum is sometimes efficacious. Occasionally a patient dies from exhaustion.

No operation is entirely free from danger. We often advise operation, but only under special conditions do we urge it. We never have seen the persistent and sometimes serious vomiting, following gas and oxygen that is so common with ether or chloroform. Pain, when severe, should be controlled by codein, given subcutaneously. It does not inhibit glandular activity. To be sure, the quantity should be curtailed as much as possible, but we think it is a wrong principle to allow patients to suffer with pain and fret for hours. Codein does not induce habit easily; it is more easily withdrawn than morphine, and in general produces less gastric distress, or bad dreams. I am a firm believer in large doses of anything that will control motion and sensation in the presence of a soiled peritoneum; motion is provocative of pain in any acute condition, and especially so in the bowel. Therefore, in peritonitis, we believe in the free use of opium to limit motion and maintain physical and mental rest. We prefer to have our patients bordering on unconsciousness for forty-eight hours by its use.

If we knew all the exact factors that cause abdominal distention, we might more easily combat it. Distention is often severe when there is no pathology in the abdomen, as a severe concomitant pneumonia, a stitch abscess, or operations following inguinal hernia. We occasionally have no meteorism following a severe abdominal or pelvic operation, which has been attended by much handling and considerable exposure, but such cases are rare. The writer feels that rough handling and long exposure of the viscera to air and foreign bodies, or pulling upon the mesentery, or the grasping of masses of tissue in the effort to get a single bleeding vessel, are likely to stimulate the splanchnics and induce paralytic ileus. The liberal use of sponges, and especially dry ones, is a pernicious practice in this respect.

The sole purpose of this paper is to focus thought on this point, not on the question of distention *per se*, but the factors which produce it.

I was surprised to read in the transactions of last year, that part of Doctor Reder's paper, in which he said, "Our later knowledge of preoperative care and general surgical technic, had not decreased postoperative abdominal distention." I wish to say, with all the emphasis at my command, that that part of his otherwise splendid contribution is wrong. As nature abhors a vacuum, so does she also the handling and exposure of those sacred precincts that were never intended even to be seen, and when we frustrate her plan she balks and her whole sympathetic system speaks to us in no uncertain words,

and one of these is distention. Therefore, the most important feature in treatment of this symptom is prophylaxis.

Gas pains following operations are by far the most distressing to the patient of anything she has to endure. A few die each year as a result of bowel inertia. If there be no contraindication, we endeavor to induce bowel movement on the second day by means of magnesium sulphate or castor oil given either by mouth or by rectum. The use of a rectal tube allowed to remain *in situ* for some time, is often beneficial. Medication by mouth is disappointing. After a day or two, when food can be retained, occasionally bread crusts and coarse stale bread with butter will often induce peristalsis. We have not found any single remedy to be of universal good. Pituitrin has more nearly reached that place than any other. Eserin, even in large doses, as recommended by Craig, has been disappointing in our hands.

The use of alum water, turpentine and asafetida per rectum are routine remedies. I have never used the Kemp's tube, as recommended by Dickinson. We often see the expression in medical periodicals, "the high rectal injection." If by that they mean that the rectal tube is passed through the rectum and sigmoid into the colon, then the expression is erroneous, for rectal tubes cannot be made to reach this area.

In closing, I wish to leave these thoughts:

1. Our patients are entitled to more preoperative and postoperative care than they have been receiving.
2. Patients suffer from shock by long anesthetics, exposures and rough handling of tissues.
3. Surgery is a thing of art and gentleness as well as knowledge and skill.

GAS OFFICE BUILDING.

OPERATIVE JUDGMENT AS A FACTOR IN SURGICAL MORTALITY AND MORBIDITY.*

BY

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At the present time, it seems as though the anxiety to be known as a research worker or the desire to exhibit a remarkable degree of manual dexterity for the benefit of the bystanders were in danger

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of subordinating that most important factor in lowering surgical morbidity and mortality in the case of the individual patient, viz., surgical judgment.

The writer would be among the last to belittle research and laboratory work, and he envies the chosen few that dexterity which is not the heritage of the majority, but he desires to enter a plea for the benefit of the individual patient who falls into the hands of the surgeon.

Time was, and not beyond the memory of some of us, when surgery was a matter of manual craftsmanship. But a limited number of operations were performed and the factors involved were simple, so that the vital question was one of speed, dexterity, ability to do a finished job in the shortest possible time, and in the middle decades of the preceding century that man who could perform an amputation or do a lithotomy the most rapidly was the man who deservedly won surgical success. Surgery then was purely an art and as a science could scarcely be said to exist.

Then appeared the era of science as applied to human physiology and those departures from the normal which we know as disease processes, and the revelations of bacteriology, chemistry, and physics made it appear that medicine and surgery were, at last, to be upon the secure footing of one of the exact sciences. Perhaps the time is coming when this will be true, when with instruments of precision all the functions of the body will be measurable, when every deviation from the normal will be capable of recognition, and when this millenium of diagnosis shall have arrived the means for correction of every error will be at hand. To-day the ultrascientific laboratory worker who is not a clinician would persuade us that this surgical millenium is almost here, and some few surgeons are willing to accept the diagnoses of clinically untrained internes and assistants, whose conclusions are purely academic in their origin and whose knowledge of the efficacy of treatment is based entirely upon the results observed while patients remain in the hospital. The research laboratories have placed at our command a great mass of data, but out of this mass there are as yet so few facts whose interrelations are thoroughly understood, that the placing of diagnoses in the hands of those without clinical training is pure folly, and acceptance of their dicta as to the course of treatment to be pursued is worse.

It is to be feared that the immature judgment of such untrained men is further warped by their desire to keep up the clinic of their chief, and certain it is that the reputed results of certain methods of

treatment are exaggerated in order to show that his methods of treatment, operative or otherwise, are superior to any other.

As opposed to this is the group study of instances of obscure disease in which the clinical and x-ray laboratory men collaborate with the trained internist so far as possible in establishing a diagnosis, while the experienced clinical surgeon uses all the data they have collected, makes his own independent examination, and either operates or stays his hand with but one object in view, viz., the good of the individual patient, and his final decision after all is governed by one predominant factor, and that is his surgical judgment.

If he operates, the particular operation he performs, whether it is done under local, nitrous oxide, or ether anesthesia or a combination of all of them, whether he does a rapid, simple, almost crude operation, or a slow, painstaking, academic dissection, whether he drains or closes up, will depend again upon factors other than theoretical considerations, and that factor which is most important is his surgical judgment.

In the matter of the particular operation which he performs, allow me to cite two or three widely separated types of cases as examples.

Exophthalmic Goiter.—There may be an honest difference of opinion as to whether Basedow's disease is a medical or surgical condition, but there can be no honest difference of opinion as to the outcome of properly applied surgical treatment. Even this rarely gives a complete cure in the sense that all the symptoms are relieved permanently and at once, but it does convert the patient from an invalid or semiinvalid to one whose condition is such that self-support is possible and the health nearly as good as the average, but this result cannot be obtained by slavishly following out one method of procedure, whether that be pole ligation, tying of one or more vessels, or partial thyroidectomy. The last has a prohibitive mortality if used in each and every case, the first two are not efficient in the chronic slow going type of cases, especially in women, while they not only have a very low mortality but a high permanent recovery rate in acute cases in the male, in whom the pelvic functions do not constantly disturb the patient's nervous equilibrium. By a proper selection of cases for the various procedures, by a judicious selection of the anesthetic for the individual case, and above all by speed in operating, absolute prevention of postoperative bleeding, gentle manipulation of the gland, and sealing of the relatively large raw area by painting the wound surface with tannic acid solution combined with drainage, practically every case can be saved. I was tempted to say every case, until I recalled that even the best

surgical results do not prevent an occasional internist from frittering away valuable time with medical treatment until the patient is already moribund from myocardial degeneration.

I should like at this time to interject a word relative to preventing absorption from the wound and stimulating drainage by the use of tannic acid solution. All of us who use catgut hardened by means of tannic acid must have observed the nuisance of profuse serum accumulation in the wound, and this annoying feature led me to try painting of the entire tumor bed with 1 per cent. tannic acid solution before closing. Unquestionably there is a great increase in the drainage, and apparently a diminution in postoperative hyperthyroidism. Whether the latter observation is correct or not could only be proven by a larger number of cases than I have at my command, but its apparent correctness has encouraged me to continue its use.

Another set of cases in which surgical judgment is demanded is acute intestinal obstruction of the internal type, that is, such as is not due to hernia through the abdominal wall. Preëminently is this true of postoperative obstruction. I know of nothing so trying to the surgical honesty of the operator as the supervision of obstructive symptoms within a day or two after the successful completion of a difficult abdominal operation. Primarily the diagnosis is obscure, a conclusion as to the gravity of the situation hard to determine, and the nature of the operation necessary for its relief can be decided upon only after the abdomen is opened and the operator has made a survey of the field which must be accomplished both rapidly and accurately. The diagnosis as between paralytic ileus, postoperative peritonitis, and true obstruction can be established nowhere but at the bedside, and this diagnosis is most difficult in those cases in which the primary obstruction is neither complete nor interfering in a serious manner with the integrity of the gut wall. Only too frequently the pain in such cases is considered as merely "gas pain," the occasional vomiting is thought to be neurotic or due to the modern surgical bugaboo, acidosis, and insufficient bowel motions as the result of intestinal paresis, the observer not awakening to the true gravity of the situation until collapse, extreme pain, persistent vomiting, absolute obstipation and tympany, certify that the favorable moment for interference has passed. How can the diagnosis be made before such a catastrophe has occurred? I know of but one method, and that is through the careful, systematic, unremitting observation of the trained surgical clinician, who is willing to waive all theoretical considerations and balance with accuracy

the evidence which his own eyes, ears, and fingers place before him, giving every bit of evidence the weight which his surgical judgment dictates. Only this, and that intuition which is the result of past thought and experience, can guide to a correct diagnosis in time to forestall disaster.

Acute obstruction other than postoperative is less difficult of diagnosis because the patient has suffered no interference which in itself might be responsible for the symptoms presented, but again the laboratory findings are of no assistance save in a negative sense, the absence of marked leucocytosis indicating the *probable* absence of an inflammatory or gangrenous focus in the abdominal cavity. But let me repeat that the trained surgeon with an abundance of clinical experience behind him is the man who must make the diagnosis, because he should be able to make it more quickly than any one else and institute treatment sufficiently early to be of some avail.

In the treatment of intestinal obstruction the slavish obedience to some precept learned while a student or swallowed in its entirety because propounded by the master of a surgical clinic is likely to result in as serious a disaster as delayed diagnosis. To eviscerate every patient through a huge incision means that the operator has utterly overlooked the possibility of death from shock due to exposure of the peritoneum and much handling of the gut; to attempt operation through a wholly inadequate incision means that an enterostomy only will be done. Reopening the primary incision in postoperative obstruction is all that is needed ordinarily since the obstruction will be found in or about the operative site, and under any circumstances an incision large enough to admit the hand for exploration should be sufficient unless the obstruction is at a point far remote from the exploratory opening.

What should be done with obstruction when discovered is, of course, a sufficiently large subject for a monograph, but leaving out the rarer forms, the determination of our course of action is not extraordinarily difficult if preconceived notions or limited experience are not hampering the judgment. I wish to utter an earnest protest against the very common practice of making an enterostomy the end of every operation for acute obstruction. There is a place for enterostomy, but it is *not* the aim of every operation for obstruction, postoperative or otherwise. Enterostomy saves an occasional patient in whom the point of obstruction cannot be located and in whom overcoming of the distention allows a twist in the gut to unfold itself. It saves an occasional desperate case in which no effort to find the point of obstruction is justifiable, but even in this in-

stance a secondary operation of a serious character is always demanded. My plea here is for the use of good far reaching surgical judgment, which takes into consideration not only the present but the future condition of the patient, which does not unnecessarily hazard life at the present moment, but which does not overlook the fact that a secondary operation may be of so serious a nature that an opportunity to cure now and at once should not be passed without mature consideration. It has seemed to me that many of the patients reported as saved by an enterostomy would have done equally well without, if any attempt at overcoming the obstruction had been made, and that the idea of intestinal drainage has been worked far beyond the limits of good sense and good judgment.

So, too, with the drainage of the gut at the time of operation followed by immediate closure, on the theoretical basis that absorption of the contents of the distended bowel so soon as they reach the injured intestine is likely to prove fatal. Granted that a greatly overdilated parietic intestine is better emptied than left, how many times do we actually see the gut in such condition that if that were the only indication we would proceed to empty it? This really practical reason for emptying is only too frequently bolstered up by the theoretical consideration of possible poisonous contents above the point of constriction which poison will be absorbed by the uninjured mucosa lower down. Relatively so little of the gut is emptied by puncture, and the risk of soiling the peritoneum and wound edges is so great, that if this theory of poison were universally true it would almost invariably end in death anyway either from this source or from infection of the peritoneum and wound.

In this connection I wish to report 33 cases of acute obstruction of all types excepting intussusception, in 20 of which adhesions were released and the point of constriction oversewn if necessary but the bowel was at no time opened and all recovered; 5 in which the intestine was evacuated and then closed, with 2 deaths; 6 in which an enterostomy was made with 4 deaths; 1 resection with immediate closure recovered, and 1 entero-anastomosis recovered.

On the surface this shows a much better result for no opening of the intestine than really is true, because my own practice is to open the intestine only if it seems absolutely demanded, and it is obvious that the most seriously ill patients were treated in this manner. On the other hand, the fact that in 20 of 33 the intestine was not opened either temporarily or permanently, and that no deaths

occurred, is fair proof that some enterostomies, at least, are unnecessary.

Did time permit, I should be glad to go into two other phases of abdominal surgery in which theoretical considerations or experimental work have led us from the path of safe procedure. One of these is drainage, the other the use of cathartics, more particularly postoperative cathartics, in abdominal surgery. Perhaps, I still have time merely to touch upon them.

It is not so long since drainage was practised after every abdominal operation, and with the unclean methods of operating in vogue a few years ago it would be hazardous to say that such drainage was not a very essential factor in the recovery of many patients. Then came the swing of the pendulum with the dictum that practically every patient would recover if the abdomen were closed, or as one German surgeon declared, the abdomen should always be closed and with this closure the fate of the patient is sealed since nothing more can be done, or as one American authority wrote, the abdomen should be closed after every pelvic operation, as any abscess which might form could be opened later through the cul-de-sac of Douglas. The fear we had of pus in the tubes was lessened by the laboratory demonstration that living microorganisms were absent in the great majority of instances (one place in which research was of practical clinical value) and our fear of peritonitis from soiling the pelvic cavity with the contents of chronic pus tubes disappeared when this demonstration was verified by clinical experience. It was characteristic of the profession that it joyfully and promptly concluded that pelvic drainage was always unnecessary. What are the facts? They are that virulent peritoneal infection introduced by means of the hands or instruments to-day is almost unknown in the practice of the modern surgeon, that leaks at the suture line in surgery of the large intestine are fairly common, no matter how careful the technic, that extensive raw areas in the pelvis may not of themselves be especially dangerous, but that they often cover badly damaged, even perforated gut, and that the combination of large oozing surfaces and damaged intestine gives an excellent culture medium plus the probability that the microorganisms will migrate through the intestinal wall, and last that pelvic pus of other than gonorrheal origin is not necessarily sterile, no matter how long it may have been walled in. It follows logically that prophylactic and protective drainage (cofferdam drains) still have a very prominent place in the practice of some of us who are doing abdominal and pelvic surgery, and it is to my own partiality for

drainage, when in doubt, that I attribute the recovery of every case but one in the last 217 cases of salpingitis upon which I have operated, and the patient who died would have recovered if drainage had been practised since sepsis was secondary to slow bleeding from a vessel tied in the midst of edematous inflammatory tissue.

It is our belief that it is good surgical judgment to use a rubber dam prophylactic drain to the vicinity of sutured large intestine, especially if there has been injury during the enucleation of inflamed structures and the gut wall is infiltrated. That a cofferdam led through the vagina is all important if such enucleation leaves behind a large oozing area, and that an occasional instance of salpingo-oophorectomy even for presumptive chronic disease is saved by such drainage when raw areas are left after the removal of adherent pelvic organs whose primary infection was not due to gonorrheal salpingitis.

In a syndicated health article in one of the daily papers, I notice that a distinguished internist and ex-health officer gives advice something like the following to an inquirer who asks what to do for a beginning attack of appendicitis. Put an ice bag on the abdomen, go to bed, and take a cathartic. The article is not before me at this writing so that the quotation is not exact. It probably is well that the layman with appendicitis has too much pain to depend upon newspaper advice, but it likely would be better if the entire medical profession did not seem obsessed with the idea that calomel and salts or castor oil were sovereign remedies for every sort of abdominal trouble having pain as one of the cardinal symptoms. It would be interesting to know how many patients with appendicitis have been sent to the Great Beyond by calomel and salts.

It would be more interesting to know how many had been tormented by unnecessary distention, gas pain, and loss of sleep because of professional belief in the postoperative cathartic fetich. Aside from this morbidity, it is our positive conviction that there is a distinct mortality from the same source due to the forcing of gas and liquid feces into the temporarily paralyzed gut and consequent torsion of that portion about adherent areas. Where this idea of the value of early postoperative catharsis originated is questionable, but it was probably from the teachings of Lawson Tait, and the notion that intraabdominal drainage could be established in this manner, plus the nervous anxiety of the surgeon who knows that paresis, obstruction, and peritonitis do not exist if the bowels move, but whose judgment ought to teach him that their absence is not due to the fact that the bowels are moving. Let me repeat in con-

cluding this imperfect and admittedly dogmatic article that it is no screed against research, but the number of research workers is so small in proportion to our needs, the published results of researches are so frequently premature and unconvincing, that unless they are absolutely substantiated by thorough going clinical observation they are not to be accepted in lieu of the great laboratory which should exist at the receiving center for the five senses of the clinical surgeon.

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DISCUSSION ON THE PAPERS OF DRS. YATES, SKEEL AND CARSTENS.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—The first aphoristic statement we have heard for a long time is "postoperative cathartic feeding." That will ring in my ears for some days to come. If my friend from Detroit would try Kemp's tube I think he would find it of some advantage. He says he has not used it, yet he speaks of postoperative cathartic feeding. He feeds his patients medicine and drugs and tries to push into the lame gut, that needs to be rested, something from above. This adds to the nausea for which he gives bread crumbs. Why doesn't he wash the stomach out and let the poor thing rest? There is nothing like rest in the belly. It cannot act well without it.

Some one has said that this is an age of observation. We have research laboratories; we make observations, but nobody is doing the correlating because we have five senses and but one brain. Our five senses are working overtime and our brain is lazy. The moving picture show is all the rage. When we go to a moving picture show it does not work our brain a bit. We see with our eyes, we hear nothing, and do not understand what the lips are saying. We should observe our patients carefully. We should not put them into a hospital for the purpose of operating, but for the purpose of observation. Do not let Dr. Jones send in a case for Dr. Smith to operate upon to-morrow. Keep the patient under observation; study the case carefully; get the atmosphere for the patient and make her understand where she is. Do not give her opiates to put her to sleep, but put her to sleep with jollyng and joking. Let humor prevail. Do not let her feel that "there is nothing to be done." You may cut down the bill if you do not find as much pathology as you expected because the patient will say, "You charged me so much when you said the operation was nothing." Nevertheless, you may have saved that patient's life. Above all things, study your case. Let your intern study it and you study it with him. Use your brains. Do not go to your laboratories until you have written your diagnosis in ink, and when you have written it, stand by it.

DR. W. A. B. SELLMAN, Baltimore, Maryland.—This is a most interesting subject, and we all have the same feeling in regard to it. I must differ with the doctor who read the paper in regard to bringing patients into the hospital days or weeks before operating on them. One can easily see the evil of this. When a woman is brought to the hospital days before operation she becomes frightened. She is in

a condition of shock before operation actually takes place. I believe in preoperative treatment in the patient's home where none of these disturbing influences are present.

I do not think we should operate on a case without knowing what the diagnosis is. We must make our diagnosis and then certain preparations are necessary. In some cases it is necessary to give an eliminant, that is, cathartics by the mouth to act on the intestines. In other cases one could give urotropin or formin because it is more easily secured, and is cheaper for the patient. But I think formin as given before operation is a most valuable drug, and by allowing the patient to be in a hospital only a short time before operation she does not develop fright and dread. If the patient to be operated on occupies a room adjoining a patient that is brought from the operating room, she is likely to develop fright; she is in more or less shock, and is therefore in a bad condition to be placed under an anesthetic and be subjected to a major operation.

In regard to the use of H. M. C. tablet, I have abandoned it entirely, and if the patient is restless, I give a hypodermic of morphine and atropin, namely, $\frac{1}{4}$ of a grain of morphine with $\frac{1}{150}$ of atropin an hour before operation or before the anesthetic is administered.

I have been fortunate in having a most excellent anesthetist in whom I have every confidence and I never take the anesthetic into consideration during my operation. My anesthetist is not diverted by watching the operation. I think the anesthetist should be a graduate physician, a man who has had years of experience, and one who has been trained in a large hospital. My anesthetist is a graduate of the Johns Hopkins, where he has had an opportunity of seeing a large amount of major surgical work done; he is a laboratory man, understanding the functions of every organ in the body, and a very careful man, and he insists upon commencing the anesthetic with the essence of orange. He uses a bitter orange, claiming that sweet orange has no efficacy at all. He uses 25 per cent. of oil of bitter orange with seventy-five parts of alcohol. The result is we do not have our patient crying or struggling on the table; they do not dread anesthesia which I think is an important thing.

Many patients do not die from the shock of the operation, but death is due to shock which takes place before. The patients are in a bad condition, and if they go into a hospital a day or two before operation the shock is much less than if they are brought there and remain a week or two before operation. I think having them in the hospital several days before they are operated on has a bad effect on them. One patient will tell what she went through and how she felt after operation, and naturally the woman to be operated on will dread it and is in no condition for operation. She is not rested. Both her mind and body are active.

After an operation, if I find there is a great deal of pain, I give another hypodermic of morphine and atropin.

There is one point I would like to mention, and that is the use of drainage tubes. I do not use rubber drainage tubes any more; I use a cigarette drain of gauze wrapped with rubber tissue properly

prepared. These drains are less disturbing and much more effective than a rubber tube which becomes clogged. This gauze is like a Turkish towel, it empties the pus basin, and you get the material out of the patient's body.

DR. ALBERT GOLDSPOHN, Chicago, Illinois.—In regard to the class of cases Dr. Carstens referred to concerning which there is some uncertainty as to the diagnosis, the women attending to their business and complaining all the time with a rather negative objective condition in the pelvis, he is inclined to ascribe this trouble to adhesions, and certainly adhesions do make such trouble. But every now and then we open the abdomen and pelvis and find adhesions that have not caused any trouble; and I am satisfied that adhesions are like paper, that will allow anything be printed on it. They cannot talk back. In a number of such cases I have ascertained the mode of life of such patients, the details of their domestic life, their individual habits, things they would not confess to their own mother frequently, and have found that some of these persistent complainers who have no clear objective pathology that one could find by the closest bimanual examination, have indulged in coitus interruptus, or were given to masturbation; and you will have to use all the skill and ingenuity that you are master of, to get them to confess. But it will often succeed. This abnormal habitual excitation of the sexual orgasm that is not gratified naturally is followed by a pernicious effect upon the pelvic circulation, in that it results in an excessive hyperemia. We see a varicose condition of the broad ligaments often enough; and I am satisfied that we do have varicosity of veins in the pelvis as well as we have it in the legs. In this condition the patient will have discomfort or pain. We cannot treat it in the same way that we do a varicose condition of the legs; but we can usually offset it by an overcorrection in the sense of a suspension of the uterus up against the abdominal wall. And that can be done innocently if you know how to handle the round ligaments correctly.

In regard to the rest of patients in the hospital before operation: This is frequently needed in order to get their excretory organs in proper condition before assuming a surgical risk. Again, it is often needed to make acute inflammatory conditions in the pelvis subside properly, when they are not from the appendix, before operating. Occasionally I get a patient who has been the rounds of a number of celebrated surgeons, and has had proposed to her a gastroenterostomy or cholecystostomy, or some operation in the epigastrium, because when the woman came to the doctor she first complained of epigastric symptoms and her pelvic organs have been left quite out of consideration. I contend we cannot make up our minds finally as to what we will do for a woman until we have examined her from her head to her pelvis, beginning at the head and finishing with the pelvis. I believe we should go over the trunk as carefully as any specialist would and thoroughly convince the patient that we know her case before we pronounce a dictum with regard to her condition. What your dictum then is, she will have confidence in. There are

cases where I cannot decide with certainty that the epigastric symptoms are due to pelvic lesions. In some of them I know that they are, when they come to me. In other instances, I cannot decide positively. I will put such a woman at rest in a hospital where she is under intelligent care and have her eat about the same things that she was accustomed to eat at home, properly prepared. But she must rest, and with bed pan service. She is not to get up to defecate or urinate. Constant complete recumbency soothes or stops both the local and referred symptoms of gynecological disorders. Accordingly, when the epigastric symptoms are of a referred nature, they will stop or greatly improve upon such preliminary rest treatment, and show that epigastric surgery is not needed, if the clearly pathological conditions in the pelvis are effectively cured.

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—All of the papers in this group just read are full of interest, but it is impossible in the time limit to discuss all of them.

With reference to the paper of Doctor Carstens, will state that it is possible to have a pelvic peritonitis in a patient who does not give up and go to bed—walking cases—but upon making a bimanual examination you will find tenderness and impaired mobility of the uterus. This impairment of mobility may be of any degree from slight, to a fixed condition. In cases that give evidence of having had a pelvic inflammation, do not curet the uterus, unless you immediately open the abdomen and correct fully the pathologic condition existing. The trauma of cureting the uterus and withholding complete surgical work is quite liable to be followed by a sharp reaction. The patient suffering with cirrhotic ovaries is a chronic neurotic. The constant pain wears them out together with the reflex disturbances of the circulatory system and digestive tract. Are usually emaciated and the ovary can be palpated though smaller than normal. It is found firm and very sensitive. The tunica is thickened, and ovulation does not occur. While suffering all the time, the symptoms are all increased during the scanty menstrual period. Removal of this type of diseased ovary is essential to recovery. With but an occasional exception, I use the drop method of ether as the best and safest anesthetic. This requires a competent well trained anesthetizer to attain the ideal, and the postoperative vomiting is almost nil.

It is difficult to obtain a complete relaxation of the abdominal muscles from gas-oxygen. Besides we do have a goodly number of fatalities where it is administered by one of limited experience. I believe in lower abdominal surgery it is unnecessary to have shock. The two principal causes that produce it are hemorrhage and careless and prolonged manipulation of the abdominal viscera, both preventable in competent hands.

In that type of case that has suffered for weeks from tuboovarian suppuration, rapid pulse, some fever, loss of weight and strength, and free perspiration, who must have relief through thorough operative measures, I carry them safely over the operation without shock by a steady administration of sterile saline solution sub-

mammary during the half hour required to complete the operation. I have noted in many of these extreme cases a better pulse after completing the operation than it was for days prior thereto.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I have certainly enjoyed the paper of my friend Dr. Yates, as well as the very epigrammatic paper of Dr. Skeel. I have expressed myself on former occasions on the two subjects they have mentioned, so that I would not take the trouble to express my opinion again if it were not for the fact that they and you might think I did not still have the courage of my conviction, and that I was not still doing my own thinking in religion, politics and medicine.

Dr. Yates insists on giving these patients large doses of opium to benumb them, to stop elimination. If there is anything on earth we have learned in modern surgery, it is that we can assist nature by elimination. You can control pain; you may control vomiting often by putting the patient profoundly asleep. But you are simply shutting up the fire in the hold of the ship; you are not destroying it. On the other hand, if by stimulating these secretions of the kidneys, the skin, and the activity of the bowels, you hasten elimination, you are driving the thief out of the door. This treatment by opium was tried by the profession and weighed in the balance and found wanting before I began to practice medicine. Certain members of the profession are trying to bring it back. It had an element of truth or it would not have survived as long as it has, but its value after abdominal operation has been disproved time and again.

The other thing I want to talk about is purgation. Doctor Skeel seems to think that the bowels, after the abdomen has been opened, are so damaged or injured or insulted that to rid them of their normal contents is to invite disease, and he wants to know where we got the idea that purgation does good. I will ask him if purgation does not do good in other conditions. All the nose and throat men purge their patients the first thing in pharyngitis or tonsillitis. If you have an acute inflammation of the eye and call in an ophthalmologist, he is very likely to give you a free purge. Lawson Tait instituted this treatment of purgation, and I got the idea of purgation by watching the immediate effects when that treatment was put into operation by my teacher Dr. Reamy, and his mortality was instantly reduced. From that time to this, I have always watched my own cases closely, and while I do not purge every case by any manner or means, yet at the hospital where I do much surgical work the Bonifield routine is well known, and when I get away from it my interns and my assistants tell me to go back to it.

A year or two ago I tried to use pituitrin, a dose every three or four hours instead of a purge, and all the boys working with me said, "Let us go back to the old routine." I admit that my patients are more uncomfortable than the average man's patients the day after operation, but I contend that the day following that, and the day following that, they are further advanced than the patient who is loaded with feces. I have learned this by bedside experience; I

did not read it in any books. When I began to take care of laparotomy cases for my predecessor the work was done largely at houses in the days when we had few trained nurses, and I nursed these cases myself, I watched the effect of this treatment hour by hour, and it was from bedside experience that I came to these conclusions.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—The subject of Dr. Yates' paper is so important that it is to be regretted that only twenty minutes can be allotted to the essayist and only five minutes to each one who discusses it.

In the preparation of the patient for the strain of a major operation as great care in every minute detail should be exercised as is given to an athlete about to engage in any important physical contest. In emergency cases, of course, this cannot always be done, but even in these cases the preoperative care should be as complete as possible. It is my practice, where circumstances permit, to begin the preoperative preparation of the patient with the mouth and to go right through to the anus. Particular attention should be given to putting the teeth in a reasonably clean condition before operation, and the rest of the mouth, the nose and the throat, especially the posterior pharynx, should be put in as good condition as possible. As to the remainder of the alimentary canal, all are agreed that it should be thoroughly cleared out, whether by enemata or by cathartics. I do not advocate the use of large doses of castor oil the night before the operation, thus rendering the patient wakeful and restless when quiet is so important. The gastrointestinal tract should be cleared out three or four days before operation, and a suitable diet of easily digested articles ordered, thus forestalling acidosis of the starvation type. It is better to remove gas before the patient is in a depleted condition than to remove it after operation. It is better to fortify the patient before operation. It is, therefore, my routine practice to hydrate with an alkaline solution or dextrose water for two or three days before the surgical intervention. More attention should be paid to the condition of the urine. If the urine is of high specific gravity, as Dr. Humiston has said, one should not proceed until this is corrected.

Urine markedly acid from the by-products of the intestinal canal or other toxins should be rendered mildly acid or neutral before proceeding. This may necessitate the use of colonic irrigation, which I have found of great value. I sometimes order 6, 8, or even 12 gallons of alkaline water during the day, using the Kemp tube, or the two rubber tubes employed by Dickinson for postoperative irrigation, inserting one 8 inches and the other 2 inches, and using a teaspoonful of bicarbonate of soda to the pint of water. With the requisite care on the part of the nurse, this plan will soon bring the urine to the neutral point without discomfort. In many cases I employ hypodermoclysis. I have found this advantageous in severe abdominal operations, such as colectomy, or the removal of other abdominal organs. After the anesthesia is complete the hypodermoclysis needles are inserted under the breasts, and from 2 to 3 quarts of saline or tap water introduced, the

administration continuing throughout the operation. After the operation, if necessary, soda solution, 1 dram to the pint of water, is given by the Murphy drip, 40 drops to the minute. Experience has shown, in my hands and those of many others, that the use of 1 to 3 quarts of normal saline solution, introduced under the breasts or into the rectum, is distinctly advantageous, and is taken up by the patient without necessarily throwing too much weight on the heart or overloading the kidneys, as some have suggested, although such possibilities are to be borne in mind. After operation I never employ saline solution, preferring bicarbonate of soda or tap water. To continue the saline would certainly entail the danger of overloading the kidneys.

Referring to the matter of rubber drainage, I have followed the practice of Sir Berkeley Moynihan of having a spiral slit in the tube for all drainage other than that of a hollow viscus. The use of gauze drainage is most questionable.

DR. JAMES E. DAVIS, Detroit, Michigan.—Referring to Dr. Carstens' paper, I want to make a plea for a closer study of gross pathology. It does not seem that anywhere in this country is there an adequate assembling of material for a careful study in gross pathology. Some of the laboratories are beginning to do this work, and already there is a good beginning, but physicians could be made better diagnosticians if we had the opportunity of studying on an extensive scale gross pathological material.

Just one example of how valuable the observation of gross pathology is in the study of gynecological disease, let us take, for instance, the examination of Skene's ducts, the uterine cervix, and the orifice of the Bartholinian duct in revealing when we have gonorrheal infection. A careful study of these parts will help us materially in making a diagnosis of gonorrheal conditions, which we all admit are etiological for a great deal of the pathology found in the pelvis.

Dr. Yates has spoken of demonstrable pathology. That is largely a personal equation. One man will notice what another man may not notice, so here one must be specially trained for advantageous observation in gross pathology.

I think Dr. Skeel has rather minimized the work of research workers. I think this lesson should be taken by clinicians. If we would use somewhat the same methods that the research workers use, we would be able to advance our clinical methods very much more rapidly than we do.

Dr. Yates spoke of the use of small quantities of water following operations. I believe that small quantities of water are not of any particular advantage. It has been shown by Hertz that if you give a smaller quantity than 4 ounces of water on an empty stomach, it will remain there for a long time until the quantity accumulates to over 4 ounces. If we give 8 ounces or more the stomach will contract and empty that amount of water easily in thirty minutes, or if the patient wishes to vomit he can do so more easily rather than strain with a spoonful, or 1 or 2 ounces.

In regard to the use of formin, it does not seem to me that it is a

wise procedure, when we find that the centrifuged urines under the microscope will very frequently show numerous red blood cells after you have given a number of doses of formin. This cannot be a safe procedure to follow, during a number of days preceding operative measures.

In regard to catharsis, Novy, and DeCrief have shown in an unpublished work that sensitization can be secured by injury to the epithelium of the gastrointestinal tract. If we frequently examine the epithelial surface of the alimentary canal, we will be surprised to notice the number of erosions that take place following vigorous catharsis, and if we allow proteins following this there is often a very marked sensitization produced which is most deleterious for patients about to be operated upon. Many of us have recollections of the vigorous catharsis after seeing these patients the next day. It is much better to give cathartics long enough before an operation, so that the patient can recover from any sensitization that may result.

In regard to the submammary use of salines, Novy and DeCrief have also shown in the use of salines we can have marked sensitization in many patients. Just two weeks ago I saw an example of very marked sensitization, from the use of salines given under the breast.

DR. O. H. ELBRECHT, St. Louis, Mo.—The subject of normal saline solution given under the breasts or by proctoclysis has received too little attention in this discussion. Dr. Bainbridge spoke in rather large figures as to the amount of saline he gives under the breast, he said 2 or 3 quarts. I think we all have given too much at some time or rather for there is no question but every now and then we meet with cases that we are overloading and notwithstanding all the nice surgical work done on the operating table, we are likely to kill such patients by overloading the heart too suddenly, and this applies whether the saline is given under the breast, intravenously, or otherwise. I feel certain that I have made this mistake like many others in my earlier work.

DR. HUMISTON.—How do you give it?

DR. ELBRECHT.—By all three methods.

DR. HUMISTON.—The absorption is slight.

DR. ELBRECHT.—You should figure on how much fluid you are throwing in at one time. If you use several quarts and patients are weak from shock they cannot handle it. It is better to give say 750 to 1000 c.c. and repeat it if necessary. The same thing is true of ordinary saline given by proctoclysis, where overabsorption sometimes takes place, for these patients become edematous and no doubt many of you have seen this phenomena. The point I wish to make is that saline intravenously can be overdone, and saline given under the breast can be overdone. If you would save your patient with saline-solution you can do so just as well with a pint and a half or a quart and repeating the dose on indication rather than by giving too much at one time. If this rule is not regarded it is just the same as putting too big a load on a tired horse going up hill, because of the

of the load being too heavy he will have to stop and just so with a weak heart that is overloaded.

DR. CARSTENS (closing on his part).—I have nothing to say in closing the discussion on my own paper; I would like to say a word or two about the other papers.

On general principles, I agree with most that has been said by Dr. Yates. You must get the patient in good general condition, having no material in the intestines that will create irritation. I try to do that. Before I send the patient to the hospital, if I possibly can I treat her for a while, when I do not know whether I shall operate or not. I try to put her in as good general condition as possible, and let her take, if necessary, cathartics a day or two before she is sent to the hospital, and when I decide she needs operation, I operate the next day. There are, however, cases in which I cannot make that necessary diagnosis at the patient's home. I have got to have them in the hospital where I can have a blood examination made and a Wassermann test, and the urine collected for twenty-four hours. That cannot be done in the office, hence the importance of sending them to the hospital for three or four days before operating, and if they do not require operation I send them home. This habit of having patients in a hospital several days before undergoing an operation is dangerous. Such a patient, if she hears another patient scream, is put in an unhappy frame of mind, and she thinks that the Society for the Prevention of Cruelty to Animals should come in and get busy. (Laughter.) Only last week I heard a patient scream to such an extent that she could be heard on three different floors of the hospital. I asked what was the matter with the patient, and was told that she had a severe pain, that her doctor did not believe in giving morphin. Like my friend Bonifield from Cincinnati, I suppose this practitioner believed in giving cathartics. I would like to ask, what in the name of common sense are morphin and opium made for anyway except to relieve pain? If a doctor cannot relieve pain, of what use is he anyway? I believe we should give morphin or opium or any drug to relieve the pains of these patients. If a patient has had for several days food that is free from purin matter, and the stomach and bowels are in good condition, a couple of doses of morphin will relieve that patient and give him or her a good sleep for twenty-four or seventy-two hours. It will not hurt the patient because he or she does not need elimination. There is nothing to eliminate.

When it comes to giving a patient with an injured intestine which you have been cutting or slicing up, and sewing it end to end, or making a hole in the stomach and joining it to the opening in the intestine, and so forth, I think it is the most absurd thing that I can think of, and I regard it as mighty poor practice. What do you do with a patient who has a fracture? You do not give that patient any cathartics do you? No, you put the leg in a splint to keep it quiet, so that circulation can be reëstablished and the lymphatics can be at work to absorb the dead blood, and that patient in a week will feel good. The same thing applies to an

injury of the intestine. An injured intestine is like a sore leg, if you give it a little rest and do not move the patient's bowels for four or five days, thus giving the poor, sore bowel rest, the patient will get along very much better. In some cases you do not give enemas, In other cases you need to wash out the stomach, but to say we should never give any morphin or cathartics is very absurd. A good dose of opium will keep many of these patients quiet. We must treat each individual case by itself, and therefore I would heartily endorse what Dr. Yates has said. When I was engaged in general practice I had hundreds of cases, and I could not attend to all of them as I would like to have done and do my obstetrical work as well. When I developed into an abdominal surgeon I found out I could not do abdominal surgery successfully and attend to obstetrics as well, then I had to give up obstetrics and devote myself exclusively to abdominal surgery, so that I could devote my individual attention to these patients and not depend upon my house physician and the nurse and others.

DR. YATES (closing the discussion on his part).—Dr. Carstens in his remarks has brought out practically all that I was going to say, particularly with reference to the comparison he made of the broken arm and injured intestine.

Dr. Dickinson's manner of putting patients to sleep by hypnotism is splendid, and I presume down in New Jersey they sleep that way. Many of my patients are frightened when they come to the hospital, and if they are not frightened, they are nervous so that they are mentally unrested, and I give them a suitable remedy to make them sleep. It may be opium, trional, or something else. If I put the patient at rest by giving such a drug she is ready for operation the next day. I do not know that we all believe in what Dr. Crile does, namely, anoci-association. I do not suppose we will believe in that, but Crile's microphotographs and pictures show the condition of the brain cells before and after excitement, before and after injury in all these cases which make up the symptom-complex of shock. We cannot get away from that point, and if we give a patient enough opium or anything else, paying attention to the elimination, that patient is going to rest, and when he or she comes to the operating table the next day, she will be in a better condition for defense. She needs all the defense she can get from the most of us.

Dr. Dickinson said that so far as he was concerned, he believed that we should make our diagnosis and stand by it, and that was all there was to it, but that we should go and have our laboratory findings, etc. I am glad Dr. Dickinson has that erudition. Personally, I have to use a stethoscope to listen to the heart; I have to use an instrument for observing blood pressure; I have to use the urinometer; I have to use the blood counting apparatus; I have to use the Wassermann test; I have to find out if my patient has a leukocytosis or if he has not, and all of these things are simply methods of precision, the same as our palpatory or auscultatory methods are means of precision; they are the means of helping us to

make a diagnosis, and unless the surgeon of the present day uses these means he will not make a proper or accurate diagnosis.

I do not know exactly what Dr. Bonifield's position is with reference to purgation. I do not know what he means and when he begins it; but in the preparation of this paper I have endeavored to show that we should attend to the elimination of these patients and have their bowels free one or two days before operation is performed, and that we should have the patient's bowels at rest and, if necessary, give a dose of opium. After a patient is convalescing for a couple of days, it is the common knowledge of all of us that we feel better if we can get a little elimination, and if we can do it by some natural means, we find the patient feels better. We feel better if the patient has free elimination. It helps the passage of gas and all that sort of thing, but if we have a patient who has pelvic peritonitis or any other kind of peritonitis, which is more or less diffused, with a soiled peritoneum, it is the type of case that should have opium. The intestines should be kept quiet and thus keep the infection from being disseminated by the movements of the bowels.

Personally, I have never had bad results from using salt solution intravenously. There is a trend against it. I do not know how much truth there is to it. Novy has said some very interesting things on the subject and he seems to show that normal salt solution intravenously may produce anaphylactic shock. He also says that transfusion of blood and the infusion of salt water in the veins, or any other thing used in the veins, is more or less toxic, and it depends largely on how much we use as to when and how much toxicity we get.

I do not have very much fear about using all the water we can use; I do not think it overloads the heart; it does not hurt the heart. If there is anything that adds to it, it is the bicarbonate of soda.

DR. ELBRECHT.—said that water is all right.

DR. YATES.—I beg your pardon.

DR. SKEEL (closing the discussion).—I have not very much to say in conclusion. There has been a fine flow of oratory but after all not much has been said. (Laughter.)

So far as salt solution is concerned, there is no question but that Dr. Elbrecht is right. I had unfavorable results from using it and discontinued it two or three years ago.

Dr. Davis seems to think I belittled the efforts of the research worker. I did not do that. In speaking of the interrelation of this most important adjunct to clinical work I stated that the research man was pouring forth on us many things that were absolutely unproven, and that only occasionally could we pick up something that was valuable from the entire mass of material. Unquestionably the research workers are doing their best, but their premature exploitations are not of much help to us as practitioners; therefore, we must use our five senses. There is no doubt about the efficacy of laboratory work.

In these days we are confronted by many theories to explain facts

known for many years, one of which is the demonstration of brain cells showing the effect of fear on the Purkinje cells. The possibility that fright might cause death has been known for a hundred years, and one of the earliest physiological stories I can remember is that of the student frightened to death by being slapped on the neck with a wet towel when he was expecting decapitation. The same thing is true with reference to the theory of acidosis. We have known for a great many years that patients who have been operated upon may starve to death on an insufficient liquid diet. Now we have a new fad the hydrogen ion concentration to explain it, but the fact remains precisely as was known before.

I quite agree with Dr. Bonifield that patients feel much better after their bowels move. If the intestinal tract has been tortured by the tenesmus following the administration of calomel and salts it is not at all strange that the patient feels better after the distress incident to their administration has passed off, but he would feel equally well if they had not been given at all and would have been spared that one day's discomfort.

REMOVAL OF THE APPENDIX FOR THE CURE OF TRIFACIAL NEURALGIA AND OTHER NERVE PAIN ABOUT THE HEAD AND FACE.

BY

MAURICE I. ROSENTHAL, M. D.,

Fort Wayne, Indiana.

THE apology I have to offer for presenting this very brief report of only seven cases is the startling results obtained. I do not claim from this small experience that we have established a new pathology for trifacial tic and kindred affections, but I do claim that in these seven cases we have fixed the pathology in the vermiform appendix, even though the physical and subjective evidence of appendicitis was so obscure as to be entirely overlooked. In all but one case, there was present almost symptomless chronic appendicitis of the obliterating type; the other a symptomless pus case. It is very probable that a report of 100 cases might reveal some further startling results in a condition where even a successful Gasserian operation frequently results in recurrence and might explain the unsatisfactory results from resection or evulsion of the nerve as well as from injections used with a view to chemical nerve destruction. Case VII of this series is more on the order of migraine or

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so-called sick headache. It has not been uncommon in my experience to note the cure of migraine and so-called sick headache after removal of a diseased appendix. It is quite possible that many of these cases come under the same pathology as does tic douloureux and other nerve pain about the face and head.

From the prompt cessation of the pain in six of these cases, we may conclude that the disturbance was a toxemia with selective action. If the tonsils, the teeth, the hollow bone cavities give rise to toxemias and bacteriemias of such far reaching effect, we need not be surprised if the appendix, a hollow abdominal organ with its possibilities of aerobic and anaerobic bacterial development, should give rise to a toxemia which is the basis of a selective neuritis or nerve irritation.

In Case IV we found an appendix full of pus under tension (staphylococcus pus). In this case we had a gradual reduction of the pain. In the other cases the cessation of pain was immediate. It would appear, therefore, that in Case IV we were dealing with a neuritis, in the other cases with a nerve irritation from toxins evolved by the appendix.

The following is a condensed report of seven consecutive cases.

CASE I.—Miss G. aged forty-six, Mishawaka, Ind., Fibroid tumor; complains of neuralgia of fifth nerve left side of face, covering a period of two years. Tumor causing pressure symptoms. No suggestion of appendix trouble. Operation Sept. 8, 1915. Fibroid impacted in pelvis. Hysterectomy. Appendix found diseased (appendicitis obliterans). Appendix removed. Day following operation patient remarked that she had complete relief from her pain in the face; no attention, however, was given this statement as we confidently expected a return of the neuralgia. However, when after several days she still remained free from this pain, we began to speculate as to the cause of her cure. There was no degenerative process going on in the fibroid; therefore, it occurred to us that possibly the removal of the appendix might have caused the neuralgia to disappear. We were inclined to give the matter no great consideration.

CASE II.—Miss H., daughter of Dr. Harold, Glandorf, Ohio, aged 20. Entered hospital for resection of mandibular branch of trifacial on right side. Duration of pain about one year, lately increasing in violence. Had undergone usual treatments with arsenic, quinine, salicylate, etc., etc. Had tooth extracted and piece of bone removed from jaw. After extraction of tooth pain seemed, if anything, more constant. This young lady's father, being a physician, assured me that every possible medical and dental means had been resorted to and pointed out the futility of any further efforts in that direction. Being loathe to operate on her face, unless absolutely necessary, I explained to Dr. Harold what had happened in Case

I and drew attention to the further evidence of possible appendix trouble, in that the patient had had some pain in the right side. The doctor very gladly consented that an appendectomy be made before I should operate on the jaw. Operation Sept. 13, 1915. Appendectomy; chronic appendicitis obliterans with adhesions. Sept. 14, 1915, patient free from pain. Discharged Sept. 26, 1915, free from pain. Sept. 13, 1916, patient called at Saint Joseph's Hospital, Fort Wayne, to report herself still free from pain.

CASE III.—Mr. F., Kendalville, Ind., entered Saint Joseph's Hospital, July 16, 1914. Attorney, aged fifty-two. Neuralgia infra-orbital nerve left side which had regenerated after a previous operation. Had his first attack in 1894, when the trouble was attributed to an impacted molar. Molar removed; later the other teeth were removed. Had antrum of Highmore drained in 1895. Was operated on once or twice yearly for several years after this. Sphenoid, ethmoid and antrum of Highmore operated and drained. Dr. Nicholas Senn finally secured relief by removing the mandibular branch by a long incision along the lower jaw and removing the remaining affected branches by means of Langenbeck incision (as for resection of the upper jaw). The patient gave the significant information that while under Dr. Senn's care the only medicine which seemed to afford any relief was castor oil. You will note that this case at this time antedates my experience in Cases No. I and II. Present attack began June 30, 1914. Operation July 16, 1914, resection of regenerated infraorbital branch through the antrum by incision along the scar. The anterior antral wall had been entirely removed. July 17, pain only slight. Left hospital on July 18. December 14, 1914, returned because of pain in scar under the eye. December 15, resected part of old scar. Returned to his home December 19, 1914, relieved.

September 28, 1915, returned because of pain in region of left mental foramen, extending along ramus of jaw. Operation: Injection of alcohol. Sept. 30, returned to his home relieved. Oct. 22, 1915, he returned for relief from another infraorbital attack. Operation, relief. Feb., 1916, returned with recurrence of his old trouble; close questioning revealed the fact that he had had pain in right iliac region. After laying before him the results in Cases I and II, he readily consented to having his appendix removed. Operation Feb. 17, 1916, appendectomy; appendix thickened and adherent to cecum. Result, came out of anesthetic free from pain and has remained free from pain.

CASE IV.—Mr. J. C. Payne, Ohio, aged fifty-four. Entered hospital July 19, 1916, for relief from trifacial tic; duration of malady six years. Five years ago he had partial resection of right upper jaw for tumor in antrum. Subsequently had the remaining portion of upper jaw removed for relief of pain. Since then has undergone operation eight times for relief of pain. Has been taking morphine regularly for last two weeks. No history of abdominal distress. Having laid before him the history of the previous cases, he consented to having his appendix removed before I should operate on his face.

Some tenderness was elicited on pressure at McBurney's point. Operation July 19, 1916. Appendix found distended with staphylococcus pus. He complained of pain in face on coming out of anesthetic and required morphine several times. Left hospital July 3, 1916, with some tenderness in scar under eye, but much relieved. Aug. 28, 1916, returned because of pain in scar, the peculiar pain of tic, however, not having returned. Fifty milligrams radium was applied to scar which seemed to give relief. No doubt there is some inclusion of the nerve ending in the scar in this case.

CASE V.—Sister S., Glandorf, Ohio. Referred by specialist by whom she had been treated for disease of the sinuses, with the report that notwithstanding the sinuses were healed, she still continued to have pain and asked that I take such measures as I might see fit to relieve the patient from her sufferings. Patient complained of supra-orbital and temporal pain, the temporal pain radiating toward the occiput. Disturbance of several years duration. Has had ethmoid curetted; maxillary, frontal and sphenoidal sinuses drained. X-ray and other examinations negative. Had an attack of appendicitis twelve years ago. No present evidence of appendiceal trouble. Acting upon the experience of the foregoing cases, the patient understanding that we made no promise of relief, appendectomy was done. The appendix was found to be firmly bound down by adhesions. The patient came out of her anesthetic free from pain and has remained so since.

CASE VI.—Sister M. H., Nurse at St. Joseph's Hospital, aged thirty-two. Pain began about two years ago in left side of head and over left eye and near left inner canthus. Until recently she had obtained relief when sinus was being drained. (Antrum, sphenoid and ethmoid were drained.) Operation Aug. 16, 1916. Appendix removed. Appendicitis obliterans. Came out of anesthetic free from pain and has remained free to the present time.

CASE VII.—Sister M. A., aged forty-seven. Teacher. Entered hospital Sept. 6, 1916. Has been suffering from headaches every week for seven years. Previous to entering hospital they had become quite constant, pain being over both temporal regions. Complained of pain in epigastrium at times, accompanied by vomiting. Attacks lasted from few hours to a day. No relation to menstruation. Tendency to diarrhea. No pain at McBurney's point or under costal margin. Her case had been diagnosed as gall-bladder disease. The abdomen was opened, but gall-bladder found healthy. Long retrocecal appendix extending well up toward liver and firmly adherent was found. This was removed, and the patient has been relieved of all symptoms since her operation.

It is quite possible that in Case II the impacted molar was a predisposing factor as was the case in Case III. In Case IV we had a history of tumor of the antrum, probably a fibroma. In Cases V and VI we had suppurative disturbance in the bony antrum as a predisposing factor in the selective action of the toxemia, and

in Case VII without predisposing factor we found a bilateral disturbance.

336 WEST BERRY STREET.

DISCUSSION.

DR. HERMAN E. HAYD, Buffalo, New York.—A few years ago, if I had listened to a paper like the one Dr. Rosenthal has presented to-day, I would think he was demented, but I know better now and that he is bringing to us something of interest. I believe it is possible to explain the conditions he has pointed out on the ground of intestinal toxemia or intestinal stasis or peripheral reflex irritations, because it has been my experience and your experience that after removing a bound-down appendix, or the hard toothpick-like appendix, we have afforded relief in such cases of facial neuralgia and headache as those to which Dr. Rosenthal has called our attention. Of course, if we practise surgery without our five senses, and without the judgment Dr. Skeel wishes us to cultivate, we are going to do a great deal of meddlesome surgery and do a great deal of harm; but after such experiences as the essayist has had, we must think of the possibility of such an association, and many of these chronic sufferers may be relieved, and particularly if we inquire into their cases we may find there is a tender appendix and a train of gastrointestinal symptoms.

I believe this paper is capable of doing a great deal of good, if seriously and thoughtfully considered by the fellows of this Association.

DR. ROLAND E. SKEEL, Cleveland, Ohio.—I have had two cases of sciatica that recovered *after* the removal of the appendix. I do not believe, however, the removal of the appendix had anything in the world to do with it. Most of us are familiar with the toxemic theory of the various neuritides as the result of appendicitis, but I do not believe that the sciatica in my two patients was relieved simply by removing their appendices.

A point we should consider seriously is the time that has elapsed since these operations were performed, one of them but a few days ago. Perhaps in a year from now Dr. Rosenthal will change his mind. In any event we should not accept all that has been said as proven fact upon this showing of a few recently operated patients.

DR. SIGMAR STARK, Cincinnati, Ohio.—As explanatory of the nerve phenomena coexisting in these cases of appendicitis, I would like to refer to a lecture that was delivered by Dr. Rosenow in Cincinnati last winter, the title of which in substance was "The Influence of Infections of the Gall-bladder and Appendix upon the Nervous System," and I believe some of the gentlemen present here to-day from Cincinnati were likewise present at this lecture and if so, they will recall it. In that lecture he conclusively demonstrated some interesting points bearing upon the paper under consideration. By inoculating inferior animals with streptococci obtained from infected gall-bladders or appendices of patients having herpes zoster similar manifestations would be developed in the animals. If the

patient was the victim of an associate neuritis or neuralgia, then the animals so inoculated would show on postmortem examination streptococcic and leukocytic invasion of the posterior ganglion and nerve roots corresponding to the site of trouble in the human being. The purpose of all this was to demonstrate a special affinity of certain strains of streptococci for some particular nerve tissue. These investigations of Rosenow would readily serve to explain the beneficial results the essayist obtained after appendectomy in the cases reported.

DR. O. H. ELBRECHT, St. Louis, Mo.—One hardly knows where to begin in view of the many theories that have been presented. The last speaker brought out the theories of Rosenow which have been so fruitful in new lines of thought. As you know one of the recent theories as to the etiology of rheumatism is that it is due to an obscure chronic infection somewhere, sometimes called focal infection. Just what the infective agent is nobody knows, but it is productive of a protein poisoning, sensitizing and supersensitizing, and having seeming affinities for various groups of nerves which are then classified as various forms of neuritis, neuralgia or tic. I shall confine myself to this group as it is this one that the paper deals with. Dentists have shown, as a result of the researches and observations by Hunter of London, that the mouth is a cesspool for the development of microorganisms, and that in many cases rheumatism and neuritis are due to decayed teeth, badly fitting crowns, improperly prepared root canals, causing abscesses, etc. From such conclusions it would seem that protein poisoning is the only logical thing we have to lean on.

In connection with the paper and the theories of Dr. Rosenthal, I will say that we see almost the same phenomena or apparent cures brought about by an occasional operation on an epileptic. I have seen epileptics who had convulsions of the grand mal type once a week, get well for two to three months after a laparotomy had been performed, but the epileptic seizures returned in due time. Can such cases be put into the class of cures described by the essayist? Are we dealing with a bacterial protein poisoning, caused by focal infection in the appendix and as a result of the removal of the appendix cure the tic? I want to congratulate Dr. Rosenthal on his results and wish to say further that his cases have given us much food for thought.

DR. ROSENTHAL (closing the discussion).—I should have been very much surprised if you did not laugh at the title of my paper. If I had not had the experience which I have related to you I should have laughed myself. I presented this paper to you with diffidence. It looks odd. The cases which I have presented have coincidentally shown the form of obliterating appendicitis in six of the seven cases. The effect of absorption from the appendix is entirely in accord with the work of Rosenou. I have discussed this matter with some of the fellows here and with members of the profession elsewhere, and I have received as an opinion from them this: "It is not so surprising;" "it is a toxemia." One fellow here

volunteered the information that an oculist in his city was curing hemorrhoids by proper adjustment of glasses. Such are the extremes of opinion which I have received; yet this thing is so striking that we cannot attribute it simply to the fact that we have operated upon these people. I have given you the case of one man who was operated no less than twenty times. He had a resection of the upper jaw. Here is one man who had avulsion of all the branches for the purpose of avoiding a Gasserian ganglion operation. These patients are not influenced by surgical operation. It is not mental influence. I have cited the case of a girl who took an anesthetic for the purpose of having an impacted molar removed; she had had part of the jaw bone resected, a much more impressive procedure than a well executed appendectomy. The result was startling.

I do not believe we have established the pathology for tic douloureux or neuritis or nerve irritation, but I do believe that we have revealed the fact that frequently in appendicitis we have a direct cause of a nerve irritation. Pain which disappears so suddenly and does not recur is not due to inflammatory change. That is a toxemia. In one case we actually had pus in the appendix; there we probably had a neuritis with adhesion of the nerve sheaths and all that goes with inflammatory disturbances. We did not get so prompt a result in this case. His relief was more gradual. Yet he is now free from pain.

Dr. Skeel brought up the point that I may change my mind as to a cure a year from now; that the time since these patients had been operated is too short to speak definitely as to the ultimate results.

In the light of the seriousness of the affection and the brilliant results obtained in these cases and with the hope that something dependable may develop from the work I felt justified in bringing these cases to your attention as a preliminary report.

REVIEWS.

OBSTETRICS NORMAL AND OPERATIVE. By GEORGE PEASLEE SHEARS, M. D., Professor of Obstetrics and Attending Obstetrician at the New York Polyclinic Medical School and Hospital; formerly Instructor in Obstetrics, Cornell University Medical College; Attending Obstetrician at the New York City Hospital; Senior Attending Obstetrician at the Misericordia Hospital. 419 illustrations. J. B. Lippincott Company, Philadelphia and London, 1916. Price \$6.00, net.

Dr. Shears' name is the most recent addition to the list of obstetrical text-books and constitutes the last work of the author, who died about the time of the appearance of the same. It may be regarded as the record of personal experiences and is claimed by the author to be based on a different plan from other works on the same subject. In writing his book Dr. Shears has aimed to present the more important phases, leaving out what he considers irrelevant material; consequently he omits the usual embryological, physiological and anatomical sections, and the pure theory of the subject is also treated in a more restricted manner than is usual. Viewed

from this aspect the work bears the stamp of originality, and many of the illustrations are likewise specially prepared for the work from photographs made under the author's direction, although a large number have also been borrowed from other sources. As a practical manual for the student of medicine the work has its limitations as being devoted too much to the practical side, but for the general practitioner and the post-graduate student the book may be designated as of undoubted value and assistance. Dr. Shears' book constitutes a very satisfactory addition to obstetric text-book literature.

ORTHOPEDIC SURGERY. By EDWARD H. BRADFORD, M. D., Consulting Surgeon to the Children's Hospital, Boston, and to the Boston City Hospital; Professor of Orthopedic Surgery Emeritus in Harvard University, and ROBERT W. LOVETT, M. D., Professor of Orthopedic Surgery in Harvard University; Surgeon to the Children's Hospital, Boston; Surgeon-in-chief to the Massachusetts Hospital School, Canton. Fifth Edition, profusely illustrated. William Wood and Company, New York, 1915. Price \$3.75, net.

Since the appearance of the last edition of this important work in 1911, the progress of orthopedic surgery has been such as to render another revision necessary. The scope of the present edition is stated to be practically the same as that of the last, and brevity has been secured by omitting references and the extended discussions of the views of other writers. In addition to the subjects usually treated, the chapter on infantile paralysis is of timely interest, the surgical aspect of the infection alone being considered. From this point of view the authors regard the disease pathologically as a hemorrhagic myelitis with its chief destruction situated in the cells of the anterior horns of the cord. The description of the treatment of the condition, especially the mechanical correction of deformities, is very complete and satisfactory. The operative procedures for the correction or improvement of the affected limbs being also referred to.

The book is satisfactorily printed and illustrated and constitutes an important work of reference in the literature of the subject.

A TEXT-BOOK OF PRACTICAL GYNECOLOGY. By D. TOD GILLIAM, M. D., Emeritus Professor of Gynecology in Ohio State University College of Medicine, and Sometime Professor of Gynecology Starling Medical College, Gynecologist to St. Anthony and St. Francis Hospitals; Consulting Gynecologist to Park View Sanitarium, Columbus, Ohio; Fellow of the American Association of Obstetricians and Gynecologists; Member of the American Medical Association, of the Ninth International Medical Congress, etc., and EARL M. GILLIAM, M. D., Professor of Diseases of Women in the Ohio State University, College of Medicine, Columbus, Ohio. Fifth Revised Edition. Illustrated with 352 engravings, a colored frontispiece, and 13 full-page half-tone plates. F. A. Davis Company, Philadelphia, 1916. Price \$5.00, net.

The fifth edition of this popular book has been brought up to date. The characteristics which have contributed to the success of the

earlier editions may be summarized by referring to the authors' statement in the first edition, that they have endeavored to make the book plain and practical for the student and practitioner. The authors' important contributions to gynecology constitute an interesting feature of the work and are too well known to require any further detailed notice. Particular attention has been paid to methods of treatment and a sufficient number of procedures is inserted in each case to afford a choice to the reader. The illustrations are fairly numerous but many of them seem rather the worse for wear,

OPERATIVE MIDWIFERY. By J. M. MUNRO KERR, M. D., C. M., Glas., Fellow of the Royal Faculty of Physicians and Surgeons, Glasgow; Hon. Fellow, American Gynecological Society; Professor of Obstetrics and Gynecology, Glasgow University (Muirhead Chair), Obstetric Physician, Glasgow Maternity Hospital; Gynecologist, Royal Infirmary; Past President of the Glasgow Obstetrical and Gynecological Society. Third Edition. With 308 illustrations. William Wood and Company, New York, 1916. Price \$6.00, net.

Professor Kerr's work has come to be accepted as a standard in English literature. The present edition contains a number of alterations in the text, necessitated by the developments in the subject during the past five years. The text of the work is very complete and the author's conclusions and recommendations as to the various obstetrical procedures are marked by conservatism. Numerous references and quotations from the literature serve to give the work the character of a compilation, but on the other hand the author also freely presents the results of his large personal experience. Professor Kerr's book commands attention as one of the most successful works on this subject in the English language.

SURGICAL AND GYNECOLOGICAL NURSING. By EDWARD M. PARKER, M. D., F. A. C. S., Surgeon to Providence Hospital, Washington, D. C., and SCOTT D. BRECKINRIDGE, M. D., F. A. C. S., Gynecologist to Providence Hospital, Washington, D. C. With 134 illustrations. Price \$2.50, net. J. B. Lippincott Company: Philadelphia and London, 1916.

The book herewith referred to provides an almost encyclopedic knowledge of the work of the nurse in surgical and gynecological fields. The authors discuss the subject of infection in the first part of the book, presenting possibly in too detailed a form the subject of bacteriology. In the second section surgical pathology and gynecological nomenclature is discussed, and in the third the technic of surgical nursing is considered, including the subjects of postures, bandaging, treatment of fractures, various therapeutic measures, and the manner of keeping charts and records. In the fourth part of the book the patient is described from the nurse's standpoint, and in the fifth portion the operating room and operative methods are taken up. In the concluding portions emergencies and an epitome of the common surgical and gynecological conditions is presented.

The book is very satisfactorily illustrated and the contents of the book and the manner of their presentation cannot be questioned. One may doubt, however, whether the theoretical part of the subject does not outweigh the practical, notwithstanding the authors' protest in their preface. It would seem that a far greater preliminary knowledge of medical subjects is necessary for a proper understanding of this text-book than is ordinarily possessed by the average undergraduate nurse. The work is extremely well written and can be read with interest, but it is a question whether its authors do not presume too much on the intellectual faculties of the average candidate for nursing honors. It would appear that a thorough drill in nursing practices is more essential than any attempt to absorb the theories upon which the practice of medicine and surgery are largely based. To advanced nurses the book would be of value as a text-book, but for undergraduates its efficacy must remain a matter of doubt.

MEDICAL RECORD VISITING LIST or Physicians' Diary for 1917.
Newly revised. New York: William Wood & Company.

The practitioner whose accounts are kept by the system of a visiting list need look no further. The Medical Record Visiting List has not deteriorated. It is still the smallest, lightest and cheapest policy of insurance of the professional income. As usual it contains, besides the space for daily accounts and memoranda of engagements, etc., tables of dosage and other useful information. It appears in its customary attire of red or black morocco, for thirty, sixty or ninety patients a week as desired, though more elaborate styles are obtainable.

THE PHYSICIANS VISITING LIST for 1917. P. Blakiston's Son & Co., Philadelphia.

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ITEM.

The Chicago Gynecological Society offers annually an award of One Hundred Dollars (\$100.00) to the author of the best paper presented to the Society during each year upon a subject concerning gynecology and obstetrics.

The paper must be read and defended before the Society in an open meeting, may be of any length, but must not have been read elsewhere and when read shall become the property of the Society.

Any one who desires to read a paper in this competition may address the undersigned.

104 MICHIGAN AVENUE,
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N. SPROAT HEANEY.

BRIEF OF CURRENT LITERATURE

OBSTETRICS.

Lumbar Puncture in the Fetus.—Romolo Costa (*Ann. di ost. e gin.*, June 1916) believes from clinical experience and theoretical considerations that it may be useful in the interest of the fetus to perform lumbar puncture during a podalic extraction, with a view to reducing the size of the after-coming head by removal of fluid. The diameters of the skull become reduced and molding takes place more easily. When there is a reduction of the pelvic diameters delivery of a living child may thus be accomplished. There will be less compression of the central nervous system and especially of those centers which regulate the acts of respiration and the rhythm of the heart. The execution of the puncture is easy and rapid. The body is bent and the needle introduced beside the fourth or fifth spinous process. This is useful both in contracted pelves and in insufficient dilatation of the cervix.

Leukocytes in Pregnancy, Labor and the Puerperium.—J. I. Baer's (*Surg. Gyn. and Obst.*, 1916, xxiii, 567) counts show that there is a leukocytosis of pregnancy, appearing in the ninth month, slight in amount, and especially noticeable in primiparæ. The leukocytosis of labor is marked in primiparæ, averaging 18,255, and is increased by a duration of labor beyond twenty-four hours. It is less marked in paræ-ii and is slight in III plus paræ. The height of the curve in primiparæ and multiparæ is reached on the first day of the puerperium, after which there is a rapid and constant decline to the tenth day, at which time the curve is about at the normal level. The onset of lactation does not influence the leukocyte count, except that in the "fourth day" primiparæ there is a slight secondary elevation on the preceding day—about 1500 to 2000. Age is not a factor, except in primiparæ aged twenty years and under, in whom the leukocytosis is higher than in any other group. Differential analysis showed the increase in leukocytes to be chiefly in the polymorphonuclear neutrophiles with a return to normal proportions by the third day of the puerperium, an absence of eosinophiles in about half the cases in labor, and their reappearance in normal proportions on the first day of the puerperium. The lymphocytes, large and small, mast cells and transitional types, showed nothing unusual. The Arneth analysis showed a displacement toward the left, *i. e.*, toward classes 2 and 3, but this was not constant, and no pertinent deductions could be drawn.

Treatment of Emergency Cases of Ectopic Pregnancy.—The treatment advocated by E. H. Richardson (*Johns Hopk. Hosp. Bull.*, 1916, xxvi, 262) is intermediate between that of the so-called radicals and the ultra-conservatives. In this plan all therapeutic effort is first employed to combat the shock. It consists of the use of mor-

phine hypodermically; the subcutaneous or intravenous administration of normal salt solution; when required, the employment of specific cardio-vascular and respiratory stimulants; elevation of the foot of the bed; bandaging the extremities; and the application of heat externally. As soon as the improvement, which is almost sure to follow, has occurred, as indicated particularly by a slowing of the pulse rate, a substantial increase in pulse volume and blood pressure, immediate laparotomy with evacuation of the blood and removal of the affected tube is indicated. The operation need consume only fifteen minutes, and the patient's condition will almost invariably be found better at the end than at the beginning of surgical intervention. In those exceptional cases where the usual methods of treatment fail we have in the transfusion of blood a possible life-saving measure.

Management of Labor in Border-line Contractions of Pelves.—J. O. Polak and G. W. Phelan (*Amer. Jour. Surg.*, 1916, xxx, 359) say that accurate pelvimetry is absolutely necessary in order to recognize the type of deformity: Pelvimetry without the relative estimation of the size of the fetus is of little value and that the most accurate fetometry is the test of labor. Every borderline case should be given a test of labor and that this should be conducted in a hospital under the most scrupulous asepsis. All examinations should be made through the rectum. Only in making the ultimate decision as to procedure is a vaginal examination to be made. This is then done with the patient anesthetized and under the strictest surgical technic. Spontaneous delivery will reward patience and vigilance in 80 per cent. of such cases. Pubiotomy is safe in multiparæ with flat pelvis of 7.5 cm. or over and in justomino contraction when the true conjugate is over 8.5 cm. and in funnel pelvis in primiparæ. The Doederlein technic is the simplest and safest. Extra-peritoneal section should be elected as the method of delivery when the labor has been prolonged and the membranes have been ruptured for a long time. The classical operation should be reserved for the elective cases, and finally, no hard and fixed rule can be set down for the management of any case. Each case has to be individualized.

GYNECOLOGICAL AND ABDOMINAL SURGERY.

Red Myoma of the Uterus.—S. Delle Chaije (*Ann. di ost. e gin.*, April, 1916) describes red myoma as a distinct variety of myoma of the uterus. Few cases have been reported. From the anatomopathological side red myoma is a tumor generally situated on the anterior wall of the uterus, seldom in the fundus, and constantly interstitial. It is occasionally accompanied by other nodules of different structure, being itself single. It is circumscribed by a fibrous capsule and is of a wine red color. It is formed of embryonal muscle fibers, with hyperplasia of the vessels, focal hemorrhages, and few connective-tissue fibers. It causes pain and pressure symptoms, by its rapid growth, and fever. The element of congestion represents its most characteristic peculiarity. It must be diagnosticated from

a fibroma undergoing a benign or sarcomatous degeneration, or a cystic tumor of the ovary with torsion of the pedicle. In the author's case the last was the diagnosis, and the real nature of the tumor was seen only at the operation.

Ovarian Grafts.—Franklin H. Martin (*Ann. de gyn. et d'obst.*, May-June, 1916) after going carefully over the observations on ovarian grafts published since 1911, gives his conclusions thus: This examination of the literature is somewhat disappointing with reference to the surgical value of the operation. Ovarian autografts retard and modify the symptoms of the artificial menopause, this result being dependent on the power of the graft to become vitalized in its new location. The percentage of useful autografts depends on the technic used in placing them: if they are inserted in depressions of well vascularized tissues they easily become vitalized: these results are much better than when a complicated technic is made use of to insure vascularization. The fact that heterografts and homografts are unsuccessful when the same methods are employed as with the autografts shows that there is an antagonism between the tissues of different individuals of the same species and of different species. The successful operations with homografts and heterografts would lead us to hope that in some way we may be able to suppress this antagonism and that we shall do better by allowing the choice of normal tissues for their implantation.

Uterus and Tubes Contained in an Inguinal Hernia in Man.—A. Brindeau (*Arch. mens. d'obst. et de gyn.*, April-May-June, 1916) describes a case of pseudohermaphroditism in an apparently normal man, who had perfect male sexual organs, but who showed also an inguinal hernia on the right side, descending into the scrotum. He was married and had two children. There was a mass in the right scrotum the size of a lemon, the cord ascending into the inguinal canal. The tumor was reducible. Operation for the cure of the hernia was undertaken. The mass consisted of a uterus, with the fundus below and cervix above, and of normal size. To its right horn was attached a tube of normal length, but with extremity atrophied. Under the tube was found an hypertrophied testicle, of normal consistence, covered by the epididymis and with a vas deferens ascending into the abdomen. A second tube was attached to the left horn of the uterus. By traction upon this cord a second testicle of normal appearance but much smaller than its mate was withdrawn from the abdomen. There were two epididymes, two vasa deferentia, and two round ligaments, and on each side of the uterus was a sort of broad ligament. For fear of injuring the testicle the uterus was used to plug the inguinal ring. Recovery was normal and only the testicle remained in the scrotum. The author finds eighteen similar cases recorded. Most of them had manly characteristics and had children. The uteri were generally small, the testicles normal. In some cases the uterus was continuous with a vagina opening into the urethra, explaining a flow of blood into the urethral canal which was experienced.

Spontaneous Peritonization of the Pelvis in Woman.—Fernand Chatillon (*Ann. de gyn. et d'obst.*, May-June, 1916) considers the

various means that nature employs in walling off a suppurative process in any portion of the pelvis. Various organs combine in forming these partitions which separate different parts of the pelvis. Among these the great omentum plays a large part. The author believes it worth while to study these natural means for preventing the spread of infections. In high peritonization, when the adnexa do not descend into the Douglas culdesac, peritonization is accomplished by the omentum, cecum, sigmoid, and small intestine. In low peritonization the organs descend into the culdesac and are separated by the rectum, bladder, uterus, etc. The separation may be effected by adhesions between all these organs combined, that is, mixed peritonization.

Nature of the Bactericidal Property of Vaginal Secretion.—The experiments of T. Harada (*Amer. Jour. Med. Sci.*, 1916, clii, 243) show that the bactericidal property of pregnant vaginal secretion is not greatly affected by different bacilli. The bactericidal property of pregnant vaginal secretion is gradually increased during the course of pregnancy. An increase of 0.9 per cent. of lactic acid is contained in pregnant vaginal secretion. The lactic acid does not increase during the course of pregnancy. The bactericidal substance in pregnant vaginal secretion is not of the nature of bacteriolysin, which is completed by association with complement. The bactericidal property of pregnant vaginal secretion is caused by leukin, cytase or allied substances and lactic acid. It is more affected by leukin than by cytase and lactic acid plays only a part of the bactericidal property.

Radium Treatment of Uterine Cancer.—Of twenty-five cases treated by J. Ransohoff and J. L. Ransohoff (*Annals Surg.*, 1916, lxiv, 298), 11 are still well. Of these 3 have been well for two years, 6 from one to two years, and 2 from six months to a year. Of the 11 clinical recoveries, there were 3 operable and 8 inoperable. Of the 3 operable cases one is well after two years, and 2 over one year. Recurrence after operation usually occurs within the first six months. The writers hold that cases clinically cured by radium should not be subjected to hysterectomy, as the operation is difficult and dangerous.

Hyperalgesia in Abdominal Disease.—To elicit reflex responses, D. Ligat (*Practitioner*, 1916, xcvi, 106) grasps the skin and subcutaneous tissue firmly between finger and thumb, and draws them away from the deeper layers of the abdominal wall. If hyperalgesic area be present, the patient winces, and one can tell, by the patient's expression, when such an area is being stimulated. In this method of examination, the following points should be noted: (1) The patient should be made to appreciate a pinch of definite pressure over a normal point and asked to realize the sensation, the facial expression being watched closely at the same time, for normal sensation to pinch varies widely in different individuals. (2) An exactly similar pinch is applied at the spot where the maximum response is expected. No downward pressure is made on the abdominal wall, but the skin and subcutaneous tissue are picked up from the abdominal wall and pinched with the same amount of force that had been applied in the control. (3) The direction and limitation of the ex-

tension of the hyperalgesia must be carefully noted. The writer describes his findings in various abdominal conditions, and concludes: That for diagnostic purposes all visceral pain may be regarded as due to a true viscerosensory reflex. That spread does not take place uniformly from segment to segment, but that hypertonicity, which has been set up in a certain group of spinal cells, is communicated to an adjacent group of cells which subserve the same physiological function in the spinal cord, and that the lower group of cells is the more strongly stimulated. That impulses do not pass easily from the cell groups in the spinal cord, which correspond to the lateral organs (gall-bladder, appendix, and tube), to the spinal cells, which correspond with the central organs (stomach, duodenum, and gut). That hyperalgesia elicited by pinch is of definite value for diagnostic purposes, and, under certain circumstances, for prognosis also, but that a certain percentage of negative cases exist, and that the method should be used only as a part of, and as an addition to, general clinical examination. That positive response indicates, in the majority of cases, the organ primarily diseased. That the explanation of a percentage of negative cases, and very serious cases, is block of afferent impulse. That slow distention of a viscus does not give rise to either pain or hyperalgesia. That rapid distention may give rise to pain, but that the pain cannot be localized by the patient to the offending organ—that response to hyperalgesia is negative. Probable factors giving rise to hyperalgesia are: (a) Mechanical irritation of nerve endings in mucous and submucous coats. (b) Diapedesis causing mechanical pressure on nerve endings. (c) Chemical toxins produced by organisms. (d) (*doubtful*) Irregular and excessive contraction of gut muscle *per se*.

Cancer of the Rectum and Rectosigmoid.—Cancer of the rectum is not prone to early lymphatic involvement, tending to remain a localized process until late. In no case was lymphatic extension alone the cause of inoperability. Some patients in whom the rectal glands were involved have recovered and remained well following the radical operation, but none of W. J. Mayo's (*Annals Surg.*, 1916, lxiv, 304) patients in whom the inguinal glands were involved made a permanent recovery, even after the most extensive glandular excision. The most frequent cause of inoperability was local extension of the disease to neighboring organs; the next in frequency was metastasis of the liver; and the third, peritoneal and retroperitoneal metastases. The important causes of operative mortality are: sepsis, 39.8 per cent.; nephritis, 13 per cent.; undiscovered metastatic tumors, 10.5 per cent.; hemorrhage, 6.5 per cent.; obstruction of the bowels following operation, 3 per cent. The best function following operation has been after the tube method of resection described by Balfour and the C. H. Mayo method of direct end-to-end union between the end of the sigmoid and the anal canal. Mixer advises making the colostomy in the midline just beneath the umbilicus, and Mayo has used this situation in a number of instances with satisfaction. The Mixer colostomy furnishes direct access to the lower sigmoid and rectum and facilitates cleansing, when made as the first stage of a two-stage operation. It also appears to be less

liable to late infections in the blind end following the radical operation. Moreover, it rapidly terminates a midline exploration or radical operation by placing the colostomy in the upper end of the working incision. Of the 430 patients on whom a resection was done, 364 recovered from the operation. Eliminating those who were operated on less than three years ago, we have 33.3 per cent. who lived three years or more, and 28.3 per cent. who lived five years or more, after the operation. These percentages may be increased fairly to 37.5 and 35.8 per cents., respectively, by subtracting from mortality figures the normal death-rates for corresponding ages for periods of three and five years, *i.e.*, 4.2 and 7.5 per cent.

Sarcoma of the Appendix.—In reporting a case of this condition, M. G. Wohl (*Annals Surg.*, 1916, lxiv, 311) says that it is rare, there being reported in the entire medical literature only 10 authentic cases. There is great difficulty at times to determine histologically whether or not the condition of the appendix is of chronic inflammatory or of neoplastic nature. In deciding upon the diagnosis, one should take into consideration both the clinical as well as the microscopical picture. Sarcoma of the appendix (especially the round-cell type), contrary to the viewpoint held heretofore, is highly malignant.

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ORIGINAL COMMUNICATION.

PEMPHIGUS NEONATORUM.*

BY

FREDERICK HOWARD FALLS, M. S., M. D.,

Chicago, Ill.

IN Chicago there has occurred within the last year eight or nine epidemics in the maternity departments of several hospitals. The writer has had the opportunity to study several of these and details of the bacteriology and epidemiology will be published soon in a separate report.

The epidemic at the University Hospital consisting of six cases was most carefully observed. No source of infection could be traced. The mothers were all normal on admission to the hospital. No history of previous attendance by midwives was obtained. No cases of impetigo had been recently treated at the hospital.

The lesions were perfectly typical.

The first lesion appeared on the flexor surface of the left arm at the bend of the elbow as a macule. It enlarged by peripheral extension and became pale in the center. A minute vesicle then appeared with a peripheral ring of hyperemia. This vesicle rapidly enlarged so that in a few hours it was 2 to 3 centimeters in diameter. The epidermal covering was very thin and it appeared flaccid and wrinkled. The fluid contents were at first clear and straw-colored, but a few hours later became turbid. The lesion spread centrifugally with remarkable rapidity so that within twenty-four hours it was as large as a dollar. Other lesions of a similar character rapidly appeared on other parts of the body. Many of the lesions ruptured before attaining the size of the one described but in other respects they answered its description. The base of the vesicle after rupture was seen to be moist, hyperemic and glistening. In a few cases there was a tendency to peripheral extension even after rupture but as a rule the lesions tended to heal rapidly under treatment without scar formation. There was no general manifestation of the disease. The babies nursed well and ran no temperature.

*From the Department of Experimental Medicine and of Obstetrics, University of Illinois College of Medicine, Chicago.

The leukocyte count was normal or slightly raised, averaging 15,000 whites with normal erythrocytes. A differential count was unfortunately not made.

Cultures were made on plain blood agar both anaerobically and aerobically and growth was obtained in both cases. The aerobic cultures gave the more luxuriant growth.

Culturally the organism cannot be distinguished from many strains of staphylococci. The reactions on the various media are given in the accompanying tables together with its fermentation reactions and its ability to produce acid in sugar solutions. As to its heat resistance this organism closely resembles other strains of staphylococcus pyogenes aureus. Agar tubes were inoculated and kept at 60° C., 65° C., 70° C., 75° C., 80° C. for ten, twenty and thirty minutes and then plated out. The organism was able to withstand 60° C. for one-half hour, but 65° C. for ten minutes killed all but an occasional organism.

This strain produced indol, as do other strains of staphylococci. It differs in this respect from the organism described by Clegg and Wherry(1).

On plain blood agar plates this organism was strongly hemolytic. The colonies appear gray and semitranslucent and do not become pigmented.

SUGAR FERMENTATION AFTER THREE DAYS. FERMENTATION TUBES.

Sugar	Growth in open and closed arm	Gas twenty-four hours	Gas forty-eight hours	Per cent. acid formed
Lactose.....	++ ++	o	o	0.8
Saccharose.....	++ ++	o	o	0.875
Maltose.....	+++ +++	o	o	0.85
Dextrose.....	++ o	o	o	0.80
Mannit.....	+ +	o	o	0.75
Raffinose.....	+ +	o	o	0.50
Inulin.....	+ o	o	o	0.45
Salicin.....	+ o	o	o	0.40
Control.....	o o	o	o	0.40

Phenolphthalein used as indicator. N/10 NaOH used for titration.

Media	24 hours	48 hours	72 hours	1 week
Plain Agar....	Moderate growth, slightly spreading and raised at edges, glistening smooth, translucent, no odor discoloration or pigment.	Slight, yellow pigment.	More pigment.	Pigment fairly well marked, faint musty odor.
Plain Broth....	Diffuse turbidity, some deposit.	Increased turbidity, more gray deposit.	Same.	Dense turbidity, moderate yellowish deposit.
Litmus Milk...	Less alkaline.	Less alkaline.	Less alkaline.	Acid, no coagulation, blue precipitate at bottom.
Gelatine.....	Faint cup-shape depression.	Marked depression.	More liquefaction.	Liquefaction almost complete.
Potato.....	Scant, slightly, raised, confined to streak, butyrous, faint musty odor.	More growth, more pigment, slightly darkened.	More growth, media discolored.	Strong yellow pigment, media darkened.
Loeffler Blood Serum.	Beaded at edge, deep yellow, slightly raised, glistening, butyrous, faint musty odor.	Same.	Same.	Same.
Russell Media..	Top layer reddish, yellowish intermediate layer, blue and red deep layer.	Same change more marked.	Completely acid.	No change.
Levulose.....	Good stab growth, slight surface.	Surface increased.	Same.	Light yellow moderate surface growth.
Lactose.....	Good stab, poor surface.	Increased surface growth.	Same.	Light yellow surface, good stab growth.
Inulin.....	Good stab, fair surface growth.	Increased surface growth.	Same.	Luxuriant surface orange yellow, gray at edges.
Saline.....	Slight surface, good stab.	Surface increased.	Same.	Luxuriant surface moderate stab, orange yellow.
Raffinose.....	Surface slight, stab good.	Surface increased.	Same.	Luxuriant surface orange yellow, moderate stab.

The attempts that have been made to reproduce the disease in the lower animals by the injection of this organism have been uniformly unsuccessful. Rabbits and guinea-pigs have been used and subcutaneous intradural and intraperitoneal injections are

reported by Clegg and Wherry(1). They report negative findings except for hyperemia at the site of some of the subcutaneous injections. They, however, used relatively small doses (1 c.c. of a 48-hour broth culture) and do not mention how long the organism had been cultivated artificially and on what media, before it was used in the animal experiment.

Believing that an organism which under certain circumstances appeared to be the cause of death in children affected with the disease should be pathogenic for lower animals, the writer determined to further test this point. In the first experiment it was decided to use a rather large dose to roughly determine its pathogenicity. A 24-hour blood agar slant culture in 5 c.c. of sterile normal salt solution injected intraperitoneally caused death in a half-grown guinea-pig in four days. Details of the postmortem findings and cultures in this and in other animals here mentioned will be found in an article by the writer on the "Bacteriology of Pempigus Neonatorum." (2)

It was thought that by intravenous injection the elective affinity of the organism for the skin might be demonstrated. Accordingly a half grown rabbit was injected intravenously with 2 c.c. of a heavy suspension of the organism in salt solution. The animal appeared sick the next day and died on the third day. No skin lesions appeared.

Because of the nature of the organism and because of its tendency in most human cases to remain localized in the skin while capable of causing severe manifestations and death upon gaining access to the blood stream, it was determined to inject some animals subcutaneously and some intraperitoneally to determine possible differences in behavior under the given conditions. Half-grown guinea-pigs were selected for this work.

Because the infection runs a much more severe course in children than in adults it was thought that young pigs would lend themselves more favorably to the conditions of the experiment. Two series of three pigs each were inoculated. Death occurred in all cases. Those injected intraperitoneally died sooner than those injected subcutaneously. However, in the latter series positive blood cultures and peritoneal invasion gave proof of the penetrating tendency of the organism. Particular pains were taken in this series to avoid introducing any of the bacteria into the peritoneal cavity. In the series injected intraperitoneally there was no tendency of the organisms to localize in the skin. This speaks strongly for the view that the infection is transmitted by contact

with infected material and is not a systemic infection in the early stage of the disease as has been suggested by many writers.

A peculiar tendency to cord hemorrhages with a resultant paresis was noted in some of the animals. Further experiments are in progress to determine if this is an accidental circumstance or not.

Because of the repeated failures by many observers to produce lesions in rabbits and guinea-pigs by intracutaneous injection an attempt was made to reproduce the lesion in a monkey. Not being able to obtain a young *Macacus Rhesus* monkey a young Java monkey was inoculated intradermally. An abortive vesicle resulted in forty-eight hours and after seventy-two hours it was excised and sectioned. The sections showed an elevation of the epidermal layer and some leukocytic infiltration of the underlying base. The whole lesion was very abortive in type measuring not more than 2 millimeters in diameter. There was no erythematous areola as seen in the human cases. A control inoculation with a sterile needle was negative.

The writer was able to produce a typical lesion by inoculation of a pure broth culture of the organism intradermally into his own arm. Furthermore he was able to recover the organism in pure culture from the experimental lesion. Thus for the first time all of Koch's laws with respect to this organism in this disease were fulfilled. For details of this experiment the reader is again referred to the article in the *Journal of Infectious Diseases* by the writer.

From the above data it would appear that the causative organism of this disease culturally and biologically is identical with the staphylococcus *pyogenes aureus*. Morphologically on certain media it differs slightly in that it appears as a diplococcus and occasionally forms chains. Pathogenetically it differs in that it produces a lesion that is peculiar to this type of infection. These differences, however, do not seem to be sufficient to permit us to consider the pemphigus coccus an organism of a different species as do Almquist and Clegg and Wherry(3). It would seem more correct to regard it as a peculiar strain of the staphylococcus with certain peculiarities as to morphology and pathogenic properties which differentiate it from other strains of the same organism.

A review of the various text-books of obstetrics has convinced the writer that this subject is not adequately dealt with in these. Many of the authors fail to mention the disease at all, while others confuse this disease with other conditions. Dermatological works give a more satisfactory discussion of the disease as a whole but there is considerable discrepancy in the views of the various authors on

the subject. The disease has been studied by bacteriologists and pediatricians are sometimes confronted with it for diagnosis.

Because of the existing confusion regarding the disease and of its relation and importance to a large group of clinical men in spite of its relative infrequency it was thought advisable by the writer to collect from the literature data bearing on this subject and to describe the disease in detail, giving at the same time a brief historical résumé of the important landmarks in the development of our knowledge of the disease.

INTRODUCTION.

Pemphigus neonatorum is a contagious disease of the skin occurring in infants and young children, and characterized by a vesicular eruption on various parts of the body which may become bullous. The lesions are filled with a clear fluid in which a peculiar strain of the staphylococcus aureus can be demonstrated by smears and cultures.

A great deal of confusion exists concerning the true nature of the disease, and as to where it may be best classified. This is due, in part at least, to the fact that most of the observations made on the disease have been purely clinical, although recently a few epidemics have been studied rather carefully and detailed bacteriological findings recorded.

The name pemphigus is unfortunate as pointed out by Alfeld(4) as far back as 1868. He felt that the condition was not at all analogous to the skin affection occurring in adults commonly termed pemphigus. He therefore suggested the name Morbus Bullosa Neonatorum. Hyde also felt that the disease was a clinical entity and as such should not be classified as a pemphigoid disease. The writer feels that a name descriptive of the pathology and bacteriology of the condition would be highly desirable and therefore suggests that the name Epidemic Staphylococcic Vesicular Dermatitis of the Newborn be applied to this disease.

HISTORY.

The disease was first described by Kraus in a dissertation quoted by Ohme(6) in 1773 in which both authors affirmed they had repeatedly seen epidemic pemphigus neonatorum. Scharlot(7) described a case in 1841 in which a child born of healthy parents developed the disease on the fourth day and subsequently the mother, another baby bathed in the same bath, an eight-year-old girl and the midwife on the case became infected. This is the first recorded evidence of the contagiousness of the disease.

In 1854 Plieninger(8) described two cases of pemphigus neonatorum in both of which the transmission of the disease to older people was demonstrated.

Hebra(9) in 1866 in his treatise on skin diseases mentioned a form of pemphigus neonatorum which was rapidly fatal, but he failed to describe the character and location of the lesions. The first epidemic to be carefully studied was reported by Hervieux(10) in 1868 and occurred at the Maternite de Paris. One hundred and fifty cases developed in six months at this hospital following the admission of a child with the disease in the bulbous stage. The epidemic was benign in type and only one death occurred.

Olshausen and Mekus (11) in 1870 described two epidemics occurring at Halle in 1864 and again in 1869. They made rather detailed observation. They noted that the disease occurred in epidemics and usually on the third to the seventh day after birth. Also that it was more common in the practice of certain midwives. The course of this disease was usually benign, but exceptionally death occurs. The disease might be transmitted to adults, and delicate children were predisposed to the infection. They believed that the condition had nothing to do with the cachexias but more closely resembled the exanthemata. They tried injecting rabbits with the fluid contents of the vesicles and failed to reproduce the lesion. They next inoculated a baby who was already suffering from the disease and a midwife with the same fluid. They again failed to reproduce the lesion.

Ahlfeld(4) studied an epidemic in 1872 consisting of twenty-five cases. In this epidemic all of the mothers were healthy, and he noted that the lesions appeared on children in various states of nutrition and of various body weights. He also noted that there were no lesions on the soles of the feet. In three cases no prodromal symptoms were noted but constitutional symptoms in the form of temperature and malaise were noted in three cases. He also describes the lesions well and mentions especially their rapid development. The disease was transmitted to the mother in one case. No fatal cases were observed.

Ahlfeld was the first to suggest that the name pemphigus neonatorum was inappropriate inasmuch as this name implies a constitutional disease, or a dependence upon or connection with a cachectic condition. Since this condition occurred in otherwise healthy children and might be, and usually was devoid of constitution symptoms, he felt that this name should be dropped and suggested in its place the name Morbus Bullosa Neonatorum. Ahlfeld was the

first one also to suggest that the disease was probably due to bacterial infection, although he arrived at this conclusion by analogy and produced no evidence to support this contention.

Two years later Moldenhauer(12) described an epidemic at Leipzig in which 25 per cent. of the children born developed Pemphigus Neonatorum. It appears that this epidemic was of a more virulent character than those previously described, as twelve of the ninety-eight cases terminated fatally. Three midwives developed lesions and he was able to infect a mother from a child by inoculation with the contents of vesicles. He failed, however, to reinfect a child and could not reproduce the disease in rabbits. Since the disease was apparently contagious he supposed that it probably gained entrance through the respiratory tract. He considered the question as to whether the causative factor was organic or inorganic, and decided that because of the short period of incubation that it was probably inorganic. A study of the contents of the vesicles revealed pus cells but no organisms were seen.

Roser(13) in 1876 found cocci in smears from the bullæ and Gibier(14) in 1882 confirmed this finding.

Demme(15) in 1882 isolated a diplococcus from a case of acute contagious pemphigus in a child seven years old. This is the first report of positive bacteriological cultures. The organism, however, he described as nonchromogenic, which differentiates it from the organism found by other writers. The writer feels in view of the facts regarding the chromogenic properties of the organisms he has isolated from cases of the disease, that Demme was in all probability dealing with the same type of organism but that it failed to show its chromogenetic powers under the conditions of his cultures.

Almquist(3) in 1891 isolated a diplococcus from lesions of pemphigus neonatorum which was chromogenic, and which he was able to cultivate on various media. By autoinoculation into his own forearm he was able to reproduce the typical lesion of the disease.

Sabouraud(17) in 1900 claimed after an extensive investigation of impetigo contagiosa and pemphigus neonatorum that the latter disease was due to a streptococcus invasion of the skin.

Clegg and Wherry(1) in 1906 repeating Almquist's work reaffirmed his findings and gave a more detailed account of the organism producing the lesions which they claimed to be very similar culturally and morphologically to the staphylococcus but which they assumed to be a different organism because of its different behavior upon inoculation into the skin.

ETIOLOGY.

The predisposing factors in this disease are many and in general include any condition which lowers the resistance of the skin to the infecting organism.

Age is very important. As a rule, the disease occurs in children from three days to fourteen days. It may be and frequently is transmitted to older children and to adults coming in intimate contact with the disease. However, the lesions in these older people are more abortive, do not spread so rapidly or so diffusely and are usually single. Nursing mothers frequently develop lesions on the breast similar to those on the skin of the child, and occasionally nurses caring for the babies during an epidemic will develop one or more lesions.

In older people the condition is often present as an impetigo and a case is on record in which a typical impetigo on the face of a father was transmitted and gave rise to a pemphigus neonatorum in a baby(18). A similar incident is supposed to have started the epidemic at the Cook County Hospital this year. A mother with an impetigo around the mouth on admittance was confined and her baby on the fourth day thereafter developed lesions from which many other babies developed typical pemphigus neonatorum.

Sex has little if any bearing. In Ahlfeld's series the incidence of the disease was approximately equal.

Race.—The disease occurs in all races, but is more common and more severe in the white race when the children are born in the tropics or in warm countries. The native children while not immune have a smaller percentage of incidence and mortality under the same conditions. Native adults seldom are attacked.

Social Condition.—The disease is more common in the cities and particularly in the families of the lower classes, and among the foreigners who employ midwives for their obstetrical cases. Various causes have been assigned for this, among the more important of which are the lack of cleanliness among the midwives, the poor hygienic surroundings and malnutrition of mother and baby, and the crowded conditions of the tenement classes in the summer months.

Climate has a very marked effect on the incidence of the disease. It is much more common in tropical and warm countries than in the temperate and cold climates. Indeed Clegg and Wherry(1) have stated that in the Civil Hospital in Manila, P. I., every baby born in the institution contracts the disease in the first ten days of life. The heat and the associated moisture seem to predispose the delicate

skin of the infant to the invasion of the organism when present. There has been no noticeable variation in the seasonal incidence of the epidemics that I have studied and seen reported.

General Condition.—The disease attacks children of all conditions of size and nutrition as was clearly pointed out by Ahlfeld(4). Some authors claim, and it would seem reasonable, that the disease is more severe and more apt to become malignant in the cachectic cases. However it must be kept in mind that many cases in babies of this type are confused with or complicated by syphilis, and the fatal outcome may in a certain percentage at least be attributable to this disease.

Trauma during birth is mentioned as a factor by some authors, but the development of the lesion after seven or eight days after delivery in a skin which is apparently normal in every respect makes this statement rather doubtful. In *hospital practice* are seen many more epidemics than in private practice. This is what one would expect from the highly infectious nature of the virus. The relation to midwives is interesting and important and in the presence of an epidemic this matter should be constantly kept in mind in order to minimize the danger of the spread of the infection through careless handling of cases. Dohr(19) reports an incident in which a midwife had so many cases in her practice she had to discontinue. She went to another town and began practicing again whereupon an epidemic of pemphigus promptly broke out in that town also.

The epidemic nature of the disease is well shown by the reported cases. Nearly all occurred as part of an epidemic with the exception of the cases occurring in the Manila Hospital, P. I., where according to Clegg and Wherry practically every baby born contracts the disease. The severity of the epidemics varies remarkably. The mortality varies from 0 to 50 per cent. However, it must be kept in mind that the disease is frequently confused with others which may simulate it clinically and yet have an entirely different etiology. For example, I feel that the disease described by Tillbury Fox(20) must be an entirely different nature.

"An epidemic occurred at the General Lying-in Hospital 1834-35. Apparently healthy children are seized with severe constitutional symptoms. The skin is livid, the areola of the bulla are dark; the contents fetid. The ulceration is unhealthy, deep, its surface is dark, blackish, and exudes an ichorous matter, the edges being livid, shreddy, so that large circular, depressed black gangrenous ulcers acutely produced are present. The hands and feet may be affected, but also the limbs, the genital parts, the abdomen—even

the mucous surfaces and the head, death occurring about the tenth to the twelfth day."

The general condition of the parturient canal of the mother should be considered as an etiologic factor. In all cases in the epidemic here described the mothers were perfectly normal. None of them suffered from leucorrheal discharges before the birth of the baby. The same has been reported of other epidemics. Cases have been reported, however, arising in children born of mothers suffering from an intra- or antepartum infection and in whom puerperal sepsis later developed(21). The lesions in these cases were more rapidly spreading and hemorrhagic and almost invariably ended fatally. In none of these cases, however, was bacteriological evidence advanced that the lesions were due to the organism that is usually accredited with being the specific cause of this disease.

EXCITING FACTOR.

Ahlfeld(4) in 1872 was the first to suggest that the disease might be due to a microörganism. He did not, however, advance any evidence to support his view. Demme(15) in 1886 was the first to describe and cultivate a diplococcus. He reported it as non-chromogenic. In smears it appeared as a diplococcus and occurred both intra-and extra- cellular. The organism was cultivated from a case of contagious pemphigus in a girl seven years old.

Almquist(16) in 1891 described an organism which apparently fulfilled most of Koch's laws and to which he gave the name of *Micrococcus Pemphigi Neonatorum*. This organism appeared as a diplococcus(5) in broth and in the vesicles. It closely resembled the staphylococcus aureus liquefying gelatin and producing a turbid yellow deposit in broth. It grew well at 20° C. but poorly at 15° C. He used a strain grown twenty days on artificial media for inoculation into his own arm and produced a typical blister. However, he failed to recover the organism. The lesion healed without scar formation. Cultures dried on silk threads were viable after one and one-half months.

Matzenauer(22) after a careful comparative study of pemphigus neonatorum and impetigo contagiosa histologically and bacteriologically concluded that the diseases were identical. He considered that the organisms found were indistinguishable from staphylococcus pyogenes aureus.

In 1900 Sabouraud made an extensive investigation of impetigo. He divided the cases of this disease into two main divisions or

classes, the vesicular type of Tillbury Fox and the pustular type of Bochart.

He bases his conclusions more especially on the bacteriological findings obtained by special methods of cultivation. He classifies the pemphigus neonatorum cases as the vesicular variety and claims that these are due to a streptococcus. Later the lesions become secondarily infected with a staphylococcus which organism has been wrongly supposed by most investigators to be the cause of the disease. The streptococcus was isolated in practically all cases by using serum ascites as a culture media and obtaining the contents of the vesicle in the early stages of its development. He lays great stress on the value of the liquid media in these cultural experiments. He obtained a mixture of staphylococci and streptococci when he used ascites fluid and broth in equal parts. When using plain broth he found that he obtained the staphylococcus in almost pure culture. On solid media he invariably obtained the staphylococcus. He explains these findings on the ground that the initial lesions of the disease are due to infection by the streptococcus and lays great stress on the rapidity of incidence of the lesions as a point in favor of this view. Secondary to the initial infection, and some hours or days subsequently, the lesions become infected by the staphylococcus, which in the later stages is found in pure culture in the lesions.

There are several points about the work of Sabouraud which may be called into question.

In the first place he did not reproduce the lesions by the injection into other patients of cultures of the streptococcus. Secondly, as he himself points out, the media that he used to grow the streptococcus had an inhibitory action on the growth of the staphylococcus. In cases in which a culture media was used which was favorable for both organisms he always obtained a more luxuriant growth of the staphylococcus. This organism was always present in the smears from the lesions, together with the streptococcus. It is difficult to see how Sabouraud can advance as the etiological agent of a disease an organism that has only fulfilled one of Koch's laws. Granting that a streptococcus may be present early in these cases, the fact that the staphylococcus is also present renders one quite unwarranted in drawing arbitrary conclusions from this fact alone as to which of the two is the primary and which the secondary invader. Furthermore the fact that the staphylococcus found in connection with this disease fulfills all of Koch's laws makes it appear certain that this organism alone is the cause of the disease.

Finally Sabouraud gives no description of the cultural characteristics of the streptococci. Inasmuch as staphylococci may under certain circumstances appear in short chain formation this point should be elucidated.

Block(23) in 1900 describes fifteen fatal cases and gives good pathological reports. He found streptococci in the heart's blood in several cases, but believes it to be a secondary invader. He found staphylococcus albus and aureus in the skin lesions and describes a coffee-bean-shaped diplococcus.

Clegg and Wherry(1) in 1906 isolated from cases of pemphigus neonatorum occurring in the Civil Hospital at Manila a diplococcus corresponding to those described by Almquist which closely resembled staphylococcus aureus on culture media but which showed some features which they considered distinctive. They made rather extensive tests and found in addition to Almquist's findings that litmus milk was coagulated in about a week. No indol was produced or cholera red in Dunham's broth containing 1 per cent. KNO_3 after ten days. In a 1 per cent. glucose broth solution containing one-third part sterile goats' serum growth appeared with remarkable rapidity, a tube being densely clouded, while control tubes inoculated with staphylococcus pyogenes aureus and Sarcina lutea showed only a faint growth. With the formation of acid the serum was precipitated as a dense flocculent mass. No gas was formed in 1 per cent. glucose, lactose and saccharose broth. Cloudiness appeared in both open and closed arms of the fermentation tubes.

Morphologically the organisms were indistinguishable from pyogenic staphylococci in preparations made from agar and broth. When made from milk or better serum broth the diplococcic arrangement found in smears from the vesicle contents was well reproduced. Chromogenic characteristics were better brought out on gelatine and glucose than on plain agar, 1 c.c. of a forty-eight hour broth culture in a guinea-pig intraperitoneally caused no reaction in one week. Small amounts of the same serum broth culture were injected under the skin of a rabbit. No vesicles resulted, and only small hyperemic areas appeared which disappeared in a week. Autoinoculation on the forearm of one of these authors gave a typical lesion in thirty hours, but the organism was not recovered from this experimental lesion. There was no subjective sensation except a slight itching. Resolution occurred in forty-eight hours without scar formation. Max Neisser(24) considers Almquist's organism a strain of staphylococcus. The organism corresponds exactly with the description given by Neisser of a typical staphylococcus pyogenes aureus. He, how-

ever, reports no work with Almquist's organism in support of his contention.

PATHOLOGY.

The pathology of this disease has been best described by Sabouraud(17). He divided the disease into three stages.

First: The prevesicular stage.

He obtained the necessary tissue for the study of this stage by aborting an incipient lesion by treatment with a caustic. The scale thus obtained revealed a very thin superficial epidermal layer. A deeper layer of flattened cells with intercellular edematous spaces and the infiltration of leukocytes into serous spaces of various sizes. No organisms were seen.

Second: The vesicular stage.

This stage is characterized by five main features:

First.—The thinness of the horny layer of epidermis forming the cover of the vesicle. This never raises any of the underlying tissue with it. Its thinness also explains its rapid peripheral spread.

Second.—The small number of formed elements in the early stages. In the later or pustular stage these become greatly increased.

Third.—The relatively large amount of serum which is clear at first and later becomes crowded with leukocytes.

Fourth.—Epidermal and dermal edema due to a serous intercellular exudate. Perivascular leukocytic infiltration of the derma. Thin bands of leukocytes in the spaces of the epidermis at the stratum lucidum close to the floor of the vesicle.

Fifth.—Organisms can be seen when the vesicle is fully developed. A diplococcus is usually seen and rarely short chains of three to four elements can be seen.

Third: The post-vesicular stage.

The crust or postvesicular stage is composed of a thin horny layer of epidermis superimposed upon a layer of coagulated serum with enmeshed leukocytic nuclei. These leukocytes occur in clumps. The bacteriology of the crusts is very variable. Most commonly staphylococci and streptococci were found. Unidentified bacilli and streptobacilli were noted in some cases. Gross pathological studies have been made by. H. J. Schwartz(25); twenty-seven cases were examined. There was a slight congestion of the gastrointestinal, respiratory and nervous systems. Nothing else was found. This author suggests that the cause of death may be due to changes induced secondary to destruction of a large amount of skin surface as in burns.

Blood cultures in fatal cases have yielded staphylococcus and

streptococcus. It is thought by Block(22) who made cultures in fifteen fatal cases that the streptococci were secondary invaders in every instance.

SYMPTOMS.

The disease is characterized by the appearance of the vesicular eruption on or after the third day of the patient's life and usually before the fourteenth day.

The incubation period is supposed to be about three days, and according to inoculation experiments it is about twenty-four hours from the time of injection till the vesicles appear.

The onset is sudden, the vesicles appearing on various parts of the body and rapidly multiply. The eruption is prone to appear first in the axilla and about the groins often spreading to involve the trunk, inner surface of the thighs and genitals and flexures of knees and elbows, and neck and face. The hands and feet are seldom involved except by extension of a process from a neighboring lesion.

Hyde(5) gives a classical description of the disease. "The first symptoms noted are punctate and large reddish macules resembling a flea bite. These enlarge and a thin pellicle forms over the spot, from which vesicles develop as large as hazelnuts. The lesions often burst before reaching maturity, the areola meantime spreading over a space with a diameter of several centimeters. After bursting the areas of involvement spread with centrifugal denudation of the epidermis. The fluid furnished by the lesions is scanty or abundant, golden yellow, or especially in the cases that prove fatal of a grayish tint." To this description should be added that the vesicles are rarely completely filled by the fluid but have a flaccid thin covering of epidermis and that on rupturing a deep red, moist, shiny base is seen. There is no sign that the lesions are painful or cause itching of the skin. In the autoinoculation experiment performed by the writer no subjective sensation was felt during the course of the lesion. General symptoms are conspicuous by their absence in this type of the disease.

General symptoms are recorded by many authors and are especially mentioned in connection with a second type of the disease occurring in the severe epidemics with a high mortality rate. In these cases fever as high as 104° F. is frequently seen, together with inappetence, abdominal distention, vomiting, diarrhea, cyanosis and dyspnea. A great deal of confusion has arisen because of these two types of the disease which are so startlingly different clinically.

In the first group of cases the course is absolutely benign, the baby does not lose weight, is not disturbed by the eruption, nurses well, and the lesions disappear in a few days, leaving no scar. In the second group the course is frequently rapidly fatal with all the signs of a fulminating septic infection. Much light has been thrown upon this phase of the subject by the researches of Block(23). This investigator studied a series of cases bacteriologically and pathologically and found a staphylococcus aureus and albus in the lesions. In a series of cases that died he found by careful bacteriological examination of the heart's blood a streptococcus in pure culture. This he believes to be a secondary invader because blood cultures in cases that recovered remained sterile. It would seem therefore that the invasion of the blood stream by the streptococcus is to be regarded as a complication of the disease rather than an integral part of the morbid picture and in the absence of this occurrence no general symptoms occur.

Complications.—Infection of the umbilicus and of the umbilical vein is the most important and most serious complication because it usually is caused by the streptococcus. Penetration of the tissues with resultant septicemia follows.

Endocarditis has been noted by Block.

Edema of the lungs is frequently noted at autopsy especially in the posterior portions.

Gastroenteritis with severe diarrhea may occur in the septic cases.

Prognosis.—The prognosis depends upon several factors. First the general condition of the baby. If the infant is strong and healthy and otherwise normal it will resist the infection very much better than if it is weak and marantic. Age has an important bearing. Children affected after two weeks rarely suffer so severely as do younger children. The time at which the disease is recognized and the treatment started is important. If the blebs have attained a large size and become confluent healing is delayed and the prognosis is progressively worse. According to Schwartz(25) the deleterious effects in these cases are produced by the great destruction of skin surface causing the same toxic effects as severe burns.

In infants whose mothers suffer from puerperal sepsis serious lesions are prone to develop and the prognosis is bad.

The site of the infection is less important; however, cases with marked lesions on the abdomen and trunk are more prone to have umbilical infections and hence the prognosis is more dubious.

In cases with marked symptoms of systemic invasion the prognosis

is uniformly bad. Young babies usually are apparently incapable of surviving a staphylococcic or streptococcic septicemia.

Diagnosis.—The diagnosis of this disease in typical cases is usually easy and especially so in the presence of an epidemic. However, in isolated or atypical cases considerable difficulty may be experienced. Great confusion has arisen because of attempts on the part of many writers to separate on purely clinical grounds a group of closely allied if not identical diseases. Recognizing this Hyde(5) has pointed out that dermatitis exfoliativa neonatorum and impetigo contagioso of Fox are the same disease. Pemphigus neonatorum may properly be removed from the category of affections strictly catalogued as pemphigoid. The symptoms as given above usually suffice to make the diagnosis clear and the isolation of the causative organism from the lesions in pure culture confirms the diagnosis.

Differential Diagnosis.—The condition should be differentiated from bullous syphilides. This is usually easy because babies suffering from bullous lesions of congenital syphilis in the first two weeks of life show unmistakable concomitant lesions of congenital syphilis. The location of the lesions on the palms of the hands, soles of the feet, and upon the buttocks is also characteristic.

From eczema pustulosum it is differentiated by the absence of infiltration of the affected tissues and the absence of itching and the failure of the lesions to form patches with wide separation of the lesions. The evident termination of the lesions which do not progress to form a freely discharging and crusting surface.

Varicella is rarely seen during the first two weeks of life. The vesicles are smaller and a history of an epidemic is usually obtainable.

TREATMENT.

Prophylactic.—Early diagnosis and isolation of cases are of the utmost importance. The history of most epidemics reveals the fact that the disease was present for some days before the diagnosis was established and many persons were exposed before the importance of isolation was appreciated. The method of contagion is not definitely established but the prevailing view is that intimate contact is not necessary and that infection is transmitted by medical attendants, nurses, midwives, and through bathing water, towels, and other fomites. Hence it is recommended that institutional cases be isolated as soon as the lesions appear together with the mothers of such cases; also that special nurses be assigned to these cases; and that they be cautioned regarding the possible spread of the infection to themselves unless the strictest precautions are observed in handling the cases.

Midwives who have cases appearing in their practice should be prohibited from practicing until the cases have cleaned up and until their complete outfit has undergone rigorous sterilization. The disease should be made reportable by law. This is now the case in many communities. Persons suffering from impetigo or pustular acne or any disease or condition of the skin associated with the formation of pustular lesions should be excluded from contact with new-born infants. Nurses should appreciate the highly contagious nature of the disease and should wear rubber gloves when dressing the lesions. They should avoid touching other parts of the baby's body after dressing the affected parts. A daily bath in 1 to 2000 bichloride solution has been recommended. If possible a daily change of sterilized baby clothes is advisable.

Active treatment consists in rupturing the new formed lesions as soon as they appear with a sterile needle. A 2 per cent. ammoniated mercury ointment is then applied and the lesions dressed with individual dressings to prevent extension to other parts of the body by contact. In adults the same treatment is carried out except that the ammoniated mercury ointment is 3 to 5 per cent. strength. A bichloride bath 1 to 2000 is also advised.

In the very severe cases the disease is a septicemia and should be treated accordingly, symptomatic supportive measures being adopted as indicated. Vaccines have been used in some epidemics but no striking results have been reported. The writer would suggest that they be applied prophylactically during an epidemic in cases exposed and which had not as yet shown signs of the diseases. It is well known that the skin lesions caused by the staphylococcus are among the most favorable diseases known for treatment by vaccine therapy. It is suggested that small doses, not more than 10 to 15 million, should be used. The injections should be made subcutaneously and the concentration of the vaccine so regulated that 3 to 4 drops of the suspension equals the desired dose. Vaccine treatment in the severe cases with clinical evidence of septicemia would probably be not only valueless but might be actually harmful.

General hygienic measures such as regulation of the diet and bowels, plenty of sleep and fresh air should be adopted so as to place the baby in the best condition to resist the infection.

CONCLUSIONS.

1. The disease is an epidemic staphylococcic vesicular dermatitis occurring in new-born babies as a rule but capable of being transmitted to older children and adults.

2. The causative organism is a peculiar strain of staphylococcus aureus which has fulfilled all of Koch's laws with respect to this disease.

3. The disease usually runs a benign course but may be fatal. The cause of death in the fatal cases is usually a septicemia initiated by invasion of the umbilical vessels in most of the cases.

4. The possible origin of an epidemic from impetiginous lesions on other children and adults renders it imperative that all babies be protected from such sources of contamination.

5. In the presence of an epidemic prompt isolation of all cases with special equipment and attendants together with thorough sterilization of rooms and equipment subsequently is the only efficient means of eradicating the disease.

6. The disease should be made reportable by law.

7. Early rupture of the lesions and the application of separate dressings of 2 per cent. white precipitate ointment to the lesions will control most cases.

8. In the presence of an epidemic the possible rôle of midwives and other attendants as carriers of the contagion should be kept in mind and proper measures initiated to stop the spread through these agencies.

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TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of October 12, 1916.

ROYAL STORRS HAYNES, M. D., *in the Chair.*

The subject of the evening was

"LESSONS TO THE PEDIATRIST FROM THE RECENT EPIDEMIC OF
POLIOMYELITIS."

DR. CLAUDE H. LAVINDER, U. S. Public Health Service, spoke on
EPIDEMIOLOGY AND PUBLIC HEALTH PROBLEMS.

Epidemiological studies in their ultimate analysis are really studies of modes of infection. In poliomyelitis the mode of infection does not as yet rest upon a well established basis and the results of such studies are therefore neither sure nor certain.

When Wickman, in his classical studies in Sweden, in 1905, formulated the view that poliomyelitis is a contact disease spread from person to person, and drew attention to the importance of abortive types and carriers in the transmission of the disease, he gave a view of the epidemiology of poliomyelitis which has directed all studies subsequently made. An examination of the case cards of any more or less recent epidemiological study of this disease makes it evident that they are all constructed so as to make the study essentially an attempt to support or disprove Wickman's hypothesis.

The epidemiologist is confronted with two problems: 1. The explanation as to why, in comparatively recent times, apparently this disease has assumed epidemic characteristics. 2. The finding of a consistent explanation of the method by which the disease is transmitted. Poliomyelitis apparently did not display any epidemic prevalence previous to the early eighties. Even then it appeared in only small groups of cases widely scattered, and very slowly gathered force, unexpectedly culminating this year in an epidemic whose proportions exceed anything yet recorded for this disease.

The present epidemic in New York City and the adjacent territory will probably number at its conclusion something like 20,000 reported cases. This entrance of poliomyelitis into the family of important epidemic diseases is a remarkable and unique development, for which there is no apparent explanation. With regard to the transmission in poliomyelitis, it may be said that since Wickman's time most epidemiologic studies have at least tended to confirm his views, and experimental work in the laboratory has likewise contributed to a similar result. Judging from our experience during this epidemic in an intensive study of several hundred cases in various localities, it seems more than likely that the epidemiological studies which have been made will show no great difference in their ultimate results. The conception of poliomyelitis as a contact disease in its widest sense, while receiving the qualified approval both of epidemiologic and experimental studies, nevertheless admits of some dubious points and shows not a few apparent inconsistencies.

From the epidemiologist's standpoint the present view of poliomyelitis is that the disease is due to a specific agent of which the only demonstrated natural sources are infected human beings, that is, the recognized sick, convalescents, the mild "missed" cases and carriers in good health. The infective agent is known to be discharged from these sources in the excretions of the respiratory and digestive tracts. The infective agent, while known to be fairly resistant to destructive agencies encountered outside of the human body, nevertheless, presumably does not lead a saprophytic existence. Of great significance is the experimental transmission of the disease to monkeys by rubbing the virus on the intact nasal mucous membrane. It is also significant that infection through the digestive tract, or through the agency of biting insects has been found more difficult and less constant. The total incidence of the disease in the population affected is usually small. It seems well established that the recognized cases of the disease are of far less importance in its transmission than healthy carriers and "missed" cases. Epidemiologic studies have indicated that contact is a method of transmission without, however, excluding the possibility of other methods. There are one or two marked characteristics of the disease which do not harmonize very well with our present conception as to its method of spread. These are a characteristic seasonal prevalence and an equally characteristic age incidence. Any hypothesis as to the mode of spread of this disease must be in conformity with these characteristics. Our conception of poliomyelitis is that of a respiratory infection spread by contact, and yet by analogy with all other respiratory diseases, poliomyelitis should prevail not during the summer, but during the winter months, whereas poliomyelitis corresponds in its seasonal prevalence to gastrointestinal disturbances. This is a serious inconsistency which cannot now be explained.

As to the age incidence of poliomyelitis, children under five years of age constitute a very large percentage of the cases, although they form only a very small percentage of the population. Adults,

forming usually over 50 per cent. of the total population, furnish but a small percentage of cases. This, together with the fact that the total incidence of the disease among the population is small, brings up the question of immunity. The most feasible explanation of these phenomena is the presumption of the wide prevalence of mild cases and the consequent development of specific immunity to the disease in a large part of the population. This explanation is unsatisfactory. There are other inconsistencies, such as the small percentage of secondary cases, the apparent paradox that the carrier is of more importance in the distribution of the disease than the case itself, the occurrence of cases among apparently well isolated people, and the greater prevalence among rural than urban communities. Epidemiologic studies of poliomyelitis are very much crippled by our lack of knowledge as to any definite means of diagnosis, especially in the mild case and the healthy carrier. Owing to our lack of definite knowledge as to the incubation period of this disease, and the fact that the mild case and the carrier are too frequently missed in consequence, the picture which the epidemiologist obtains of the spread of this disease is incomplete, and his conclusions therefore not so clear.

For the public health officer, whose function it may be to restrict the spread of an epidemic of this disease, poliomyelitis presents practically an impossible problem. The difficulties here again are the mild case and the carrier. The difficulties of the problem of the restriction of the spread of this disease do not excuse us from doing whatever may be possible to secure restriction, even in a small degree. Such things as the hospitalization of cases, supervision of contacts, and attempts to regulate travel, with some system of notification and other measures, while they may not restrict the spread of the disease in a large measure, may achieve the desired end at least in some degree. If our conception of poliomyelitis as a contact disease be correct, then any real restriction of its spread would seem to depend upon the development of some form of active immunization.

DR. MAY G. WILSON read a paper entitled

REVIEW OF THE SYMPTOMS OF ONSET COLLATED FROM THE CASES
AT WILLARD PARKER HOSPITAL.

This study of the prodromal symptoms of infantile paralysis was based on the histories of 400 patients admitted to the Willard Parker Hospital from July 1 to September 1, 1916, inclusive. These histories were obtained by personal interviews with parents, corroborated when possible by the family physician. Every effort was made to obtain an accurate history of the onset and course of the disease prior to admission. The symptoms given in the report were those noted from the onset of illness until the appearance of paralysis. Falls, overexertion, unusual excitement, overeating, and dentition preceding the onset were given as causes. The onset, as a rule, was acute, attacking an apparently healthy child unawares.

Fever was the most constant initial symptom, being noted in

334 cases; only 2 per cent. on careful examination gave no history of fever. The temperature rises rapidly, reaching its fastigium in twenty-four to forty-eight hours. The highest temperature noted was 106, the average 103, the duration was from one to ten days, the average being four days. The fever might fall by crisis or lysis. In cases of remission or relapse an initial fever of one or two days was followed by apparent health from two to six days, with a secondary fever and paralysis following.

Vomiting was noted as an initial symptom in sixty-seven cases, as an early symptom in 132 cases, sometimes occurring after the child had retired and slept a while, more usually, however, immediately on taking food. The vomiting was seldom repeated; in one instance it was of a projectile character.

In 156 cases there was a definite history of persistent constipation for two or more days, resisting ordinary catharsis and only relieved by repeated enemas. Fecal scybali were often found on examination.

Diarrhea was not a common symptom in this series, being present in only twenty-five cases, and being neither severe nor characteristic. Abdominal pain was noted as an initial symptom in twenty-one cases, as an early symptom in twenty-five cases. When present it is usually severe, persisting for several days and referred to the epigastrium or general and in two instances simulating appendicitis.

A study of respiratory symptoms showed that twenty-one cases complained of sore throat as an initial symptom. A red throat was noted in twenty-seven cases, follicular tonsillitis in fourteen. The examination of 100 cases at the time of admission to the hospital showed injected fauces in thirty-one cases, enlarged tonsils in eleven, exudate in three, and a mucopurulent frothy discharge in seven. Epistaxis was present as an initial symptom in two cases, coryza in seventeen cases, conjunctivitis in nine cases, and cough in thirty-eight. There were two instances of severe bronchitis. As a group these symptoms were not common nor characteristic.

The most constant nervous symptom was an early and persistent drowsiness, noted in 288 cases, that is 72 per cent., and varying from slight apathy to stupor in forty-seven cases. Irritability was next in frequency, being noted in 153 cases. Associated with irritability was marked hyperesthesia, noted in ninety-seven cases, the slightest touch or even approach being resented. Tenderness and stiffness of the neck was an early and common symptom present in 130 cases, usually referred to the neck, back, shoulders and chest. Tremor was noted in 113 cases, sometimes limited to a single group of muscles, usually of the extremities. The tremor persisted during the febrile period, preceding the paralysis by twenty-four to forty-eight hours. Two cases showed a marked coarse tremor persisting for several weeks, limited to one side of the body and resembling intention tremor; it was absent during sleep but recurred on the slightest irritation. Twitching was noted in sixty-four cases, sometimes choreiform; it often preceded a facial paralysis. Headache was present in seventy-eight cases, often persistent and severe; frontal or general headache was the first symptom complained of in

twelve cases. Convulsions were present in six cases, as an initial symptom in three. Two of these were children giving histories of previous convulsions. Delirium was noted in ten cases.

There was a history of some urinary disturbance in twenty-one cases, usually minor retention.

The skin symptoms observed were profuse sweating in forty-five cases, out of proportion to the fever present, and usually preceding paralysis. It was as a rule general; in a few instances, localized. The rashes noted were blotches on the extremities in two cases, general erythema in four, macular, resembling measles four, pustular two, herpes seven. This latter was distributed over the back and trunk, and in one instance limited to an arm, later paralyzed.

The clinical picture of the abortive type of the disease corresponded in general with the initial stage of atypical cases followed by paralysis. Mild initial symptoms might be followed by extensive paralysis and, on the other hand, cases with severe and alarming onset have shown slight paralysis and rapid recovery.

In this series 22 were males, and 178 females. The race incidence was as follows: Hebrew 152, American 76, Italian 70, Irish 50, Polish 17, German 6, Colored 6, Swedish 4, and Japanese 1. There were a total of 199 under two years of age. Of 337 exposures in the families in which the disease occurred there were fifty secondary cases. Twelve cases had had recent operations on the tonsils, eight had hypertrophied tonsils and eighty-seven had normal tonsils.

The prodromal period has been found to be the most important stage in the course of the disease, both as to early quarantine and treatment. A careful history, while not diagnostic, is very suggestive, particularly in an epidemic.

DR. LEON LOURIS read a paper entitled

PERSONAL EXPERIENCE OF THE ABORTIVE AND MENINGITIC TYPES.

The most important problem to us as physicians is the diagnosis of this disease in its incipient stage. It is absolutely essential in order to prevent the rapid spread of the disease that all cases be recognized at their very onset.

We must think of this disease as an acute systemic infection, involving, in the main, the cerebrospinal axis. The symptomatology is very frequently much less than we might expect from the concomitant extent of the cerebrospinal involvement. Extensive areas of perivascular infiltration, engorgement and edema of the membranes and cerebrospinal axis may exist without clinical evidences of their localization. Since degeneration of the nerve tissue is secondary to the acute inflammatory condition, it necessarily follows that the stage of paralysis is preceded by a generalized irritation of the cerebrospinal system. This period of irritation, the preparalytic stage, manifests itself clinically by such symptoms as headache, somnolence, irritability, hyperesthesia, general tenderness, rigidity of the neck, Kernig's sign, Macewen's sign, altered reflexes, and mild muscular weakness. The symptoms of onset of poliomyelitis are

those common to other acute infectious diseases, with a predominance of early nasopharyngeal and respiratory symptoms, or gastrointestinal disturbances. Taking these symptoms in turn we may see how they differ in their characteristics in poliomyelitis and in other diseases.

The fever is moderately high, remittent in type, sudden in onset and yet without rigor. A peculiarity is the drop frequently observed following lumbar puncture. A leukocytosis, running as high as 30,000, is usually present. This is at variance with the statement made by Muller who found the predominance of a leukopenia, 3000 to 5000 white cells, which he considered pathognomonic for poliomyelitis. The leukocytosis associated with a polynucleosis was in our experience, of no value in making a differential diagnosis.

The pulse is rapid, out of proportion to the temperature, and even in meningitic cases the pulse rate continues high. The respirations are somewhat increased, but never irregular, thus differentiating even the meningitic type of poliomyelitis from tuberculous meningitis.

Gastrointestinal symptoms are marked, vomiting being frequently continuous and persistent and bearing no relation to food, differing in this respect from the vomiting of acute gastroenteritis. Diarrhea is infrequent, while marked constipation is common. The abdomen is frequently distended and children often complain of abdominal pain suggestive of an acute surgical abdomen. Retention of urine and distention of the bladder belong to the early symptoms. This is probably caused by paresis of the abdominal and visceral muscles. This muscular paresis is not a permanent feature and soon disappears. In spite of the fever and apparent progress of the disease, the demands for food in some cases are surprising. In several instances children have been observed attempting to wipe off an imaginary foreign substance from the tongue. This is probably due to a peculiar hyperesthesia of the lingual mucous membrane.

In this epidemic rhinitis has, in the writer's observation, been less frequent than in previously reported epidemics. Pharyngitis, tonsillitis and bronchitis commonly occur. The types of tonsillitis vary widely, but usually are rather mild and not associated with the intense hyperemia commonly found in other throat infections, and were less frequently accompanied by adenitis. The lymph glands in the neck showed pronounced enlargement in but few instances. Recrudescences or relapses, as Wickman called them, were not uncommon. In some instances continuance of the fever, and the excessive amount of râles suggested an extension of the catarrhal condition to the smaller bronchioles, and the case was then diagnosed as bronchopneumonia. Instead a paralytic condition of the intercostal muscles was present which prevented the child from expelling the mucus accumulating in the bronchi. The child was drowning in its own secretions and this was interpreted as pulmonary edema. In such cases the type of respiration is entirely changed, the burden of respiration being borne by the diaphragm while the accessory muscles were not in action, and the abdomen of the child was bulging with every respiration.

The most significant symptoms of the onset of poliomyelitis are those referable to the cerebrospinal axis. The child lies in apparent stupor but if aroused is extremely irritable. In the writer's experience profound stupor bordering on coma has been seen only in the severe cases of the encephalitic and meningitic types. Somnolence has been rapidly recognized by the laity as of extreme diagnostic importance, yet the average physician has not yet learned to lay sufficient stress on this symptom.

The general posture and attitude of the child is that of hypotonicity of its musculature; a lack of resistance. An absence of patellar reflex is an early and almost pathognomonic sign and, similarly, diminution in the tendo-Achilles reflex. Skin reflexes remain normal or may be exaggerated even in a paretic part. A localized weakness may be only of a few days duration and may attack any single group of muscles. Testing the strength and tonicity of muscles should not be limited to the extremities, but should include muscles of the neck, back and abdominal wall. Paralysis limited to one-half the abdominal wall and interpreted as ventral hernia has been observed by the writer. When poliomyelitis is suspected the child should be made to sit up in bed and then one can tell whether it can hold up its head or not. If the child attempts to stand there is frequently an ataxic gait or the knees give away and the child falls in a heap on the floor. Quite a number of cases have been observed during the present epidemic in which the paralysis was limited to the spinal muscles. In the vast majority of cases these mild hypotonic and paretic conditions rapidly disappear leaving no permanent paralysis; these are the cases of the abortive type or, as Muller calls it, and justly so, the rudimentary type of poliomyelitis. This group of cases far outnumbers the paralytic cases.

Pain in the extremities and areas of hyperesthesia, general or localized, in any part of the body, serve to demonstrate the widespread involvement of the nervous system, the white substance and the posterior nerve roots, as well as the anterior horns. Frequently a slight inequality of the two sides of the face exists and is overlooked. Facial paralysis may be the only definite paralysis in evidence, and this may be apparent only when the child is disturbed or made to cry. Other symptoms are a hoarseness in the voice occasionally mistaken for croup; paralysis of the palate and tongue, usually unilateral in the more severe types; weakness of the ocular muscles, producing a temporary strabismus or ptosis, generalized muscular twitchings of the arms, legs or face, observed in several cases in the earliest stage of the disease.

Meningitic types of the disease present considerable difficulty in diagnosis. Macewen's signs should be tested for in every instance. Its presence points to an increased amount of cerebrospinal fluid. A lumbar puncture in this type of cases clinches the diagnosis. The findings in the cerebrospinal fluid in poliomyelitis are definite and pathognomonic. If one would but think of poliomyelitis as an infectious disease attacking predominantly the cerebrospinal

nervous system and that the symptoms of poliomyelitis are but the evidences of a pathology, mild or severe, of a greater or lesser portion of this system, one would more readily make the diagnosis.

DR. PHOEBE DuBOIS read a paper entitled

THE LABORATORY DIAGNOSIS OF POLIOMYELITIS.

From the laboratory findings alone an absolute diagnosis of poliomyelitis cannot be made during life. Even if a monkey inoculated with the washings from a nose and throat becomes paralyzed, without the history of the case one cannot be sure that he is not dealing with a carrier.

The laboratory is of value in poliomyelitis rather by what it rules out. Of the various procedures that may be undertaken the examination of the spinal fluid is by far the most important.

In the examination of the blood, the count as a rule shows a leukocytosis and a polynucleosis, but this is also true of the majority of the infections with which poliomyelitis may be confounded. So far complement fixation has not been successful; it would be of little value in the paralysis cases because it does not seem that the antibodies could develop before the paralysis in most cases, but it would be of aid in making sure of the abortive cases. The method of determining the presence or absence of antibodies which is at present used is too cumbersome and expensive to be of practical value. A simple method will no doubt be devised, but one cannot foretell whether it will be by complement fixation as in syphilis, by agglutination as in typhoid, a skin reaction like the von Pirquet, or by an entirely new method. At the present time the examination of the blood is of little practical value. The examination of the urine is of no diagnostic importance so far as is known.

The examination of the spinal fluid is our real standby. The fluid is clear or slightly hazy, comes out under increased pressure and is increased in amount. Attention has been called of late to the "ground glass appearance," as being of diagnostic value in poliomyelitis. Such an appearance is found in the fluids containing the larger numbers of cells. When the cells are fewer one could not say from the macroscopic appearance whether or not they are increased. Furthermore, this appearance is seen in fluids of tuberculous meningitis when a large number of cells are present, in the early purulent meningitides with slight cell reaction, and in normal fluids where there is a small amount of blood present, too small to give any color to the fluid.

A fibrin web frequently forms in poliomyelitis fluid on standing. This was at one time considered diagnostic of tuberculous meningitis.

Microscopically there is an increase of cells, marked, moderate, or slight. The experience of the writer seems to indicate that the number of cells bears no direct relation to the final outcome of the disease. These cells may be mostly polynuclears, or mostly mononuclears, more often the latter. It has been stated that early in the disease there is a preponderance of polymorphonuclears. In the large number of early fluids the writer has found an excess of polynuclears in only a relatively small percentage

of cases. Many times cells are so degenerated, even in fresh fluids, that it is difficult to classify them. There are a large number of epithelioid cells that seem to be more numerous and more frequently found in poliomyelitis than in other conditions.

The chemical findings upon which most reliance is to be placed is the prompt reduction of Fehling's solution, a well-marked ring with nitric acid and a positive reaction with Noguchi's globulin test.

The reaction both as regards chemistry and cytology differs greatly in varying cases. In the majority it is well defined and in some few cases very marked. In a small number of cases the findings so nearly approach normal that it is difficult to say whether or not an inflammatory reaction exists.

The chief conditions which have to be differentiated from poliomyelitis on the strength of a clear fluid increased in amount are tuberculous meningitis, syphilis of the central nervous system, especially acute syphilitic meningitis, and meningism. In a well-established case of tuberculous meningitis, the amount of globulin and albumin is greater than in poliomyelitis; also Fehling's solution reduces slowly or not at all, but more than one-half of the fluids do reduce Fehling's promptly. Finding tubercle bacilli, of course settles the question, and failing that, animal inoculation, but this takes four weeks. It would seem that with the history, the examination of the spinal fluid it ought to be easy to distinguish between these two conditions and ordinarily it is.

In a puzzling case last summer Lange's colloidal gold reaction gave the clue to the diagnosis. In the luetic reaction the change in color is usually the greatest in the third to the fifth tube and never exceeds a four. The meningitic reaction has its maximum in the higher dilutions. In general paresis the first three to six tubes become colorless, while in general the maximum reaction in tuberculous meningitis is beyond the middle while poliomyelitis follows more closely the luetic type with its maximum before the middle. If there is blood in the fluid it throws out the examination because of the albumin, globulin and cells thus introduced. By meningism is understood a meningeal irritation functional rather than organic, probably of toxic origin arising in the course of some disease, such as pneumonia, gastroenteritis or acute infectious diseases and accompanied by an increase of spinal fluid. Ordinarily these fluids show no increase in cells and only the normal trace of globulin and albumin. There are a few exceptions to this, namely, the fluid in prolonged severe convulsions, in severe whooping cough, and sometimes when a fluid is removed just prior to death.

The faintly cloudy fluid must be differentiated from that found in the spinal fluid of cerebrospinal meningitis caused by pyogenic organisms by exclusion; that is, if the case is one of true meningitis one should be able to demonstrate the organism in smear and culture. It must be borne in mind that meningococci autolyze quickly and are sometimes quite difficult to find, especially if they are scarce or the fluid has stood for twelve hours.

Froin's syndrome is not characteristic of any one disease, but

it does occur in poliomyelitis. It consists of a fluid bright yellow in color that coagulates spontaneously. It is due to an old hemorrhage and is so rare that it is mentioned only because it is puzzling if one happens not to have heard of it. True hemorrhagic fluid, that is where the blood is not due to accidental puncture of a vein, is rare but it does occur.

After two or three weeks as a rule the examination of the spinal fluid in poliomyelitis is of less consequence, the changes are so slight that nothing definite can be said about it. The increase in globulin and albumin usually persist longer than the increase in cells.

In conclusion, emphasis should be placed on the fact that a laboratory diagnosis of poliomyelitis is practically impossible. The clinical study and the laboratory findings must be correlated.

THE TREATMENT OF POLIOMYELITIS, PROPHYLACTIC AND CURATIVE

DR. HERMAN SCHWARZ.—As the work from Mount Sinai Hospital will be reported later, I will speak to-night mostly of my experience in private practice.

My observations on the treatment of the disease will deal mostly with the treatment with human convalescent serum. There are two methods of approaching any method of treatment in order to determine its efficiency. The first is from the statistical standpoint and the second is by observing whether the results are those expected.

I have had twenty-one cases in which I used the serum early and frequently and of these nine recovered without paralysis. Twenty-one other cases were treated by expectant methods, seventeen recovered without paralysis. This seemed to be quite a difference in favor of the cases treated expectantly.

As regards the prognosis in reference to paralysis or nonparalysis, the temperature plays no great rôle. If the patient did not die before the third or fourth day a more favorable prognosis might be given. If one was dealing with the bulbar type or paralysis of the upper parts of the body the prognosis was worse than in those cases having paralysis of the lower extremities.

In nine cases that died the cell count was less than 100. A small number of cells is not necessarily a good prognostic sign. The polynuclear count in the cases that died was relatively low; in five cases it was less than 5 per cent. and in only one case was it as high as 21 per cent.

In the making of a prognosis one is not helped by an examination of the spinal fluid.

Of twenty-six cases that were not paralyzed, nine were treated by serum and seventeen without it. In every case there was rigidity of the neck and most of the cases showed Macewen's sign. The cases that recovered without paralysis were all the cerebral type of the disease.

Of the cases that recovered without paralysis ten showed a cell count under 100; a few cases showed a cell count between one and two hundred, hence the cell count does not seem to be a point

of much value in the prognosis. Some one has said that a polymorphonuclear count of 10 per cent. or over is suggestive of poliomyelitis; it is difficult to see just what is meant by this. It seems that a cell count under 300 is not of much value in prognosis.

It has been stated that when the serum is used the temperature comes down within five or six days. It may also be stated that in cases in which no serum is used there is a decided drop on the third day. The duration of the temperature does not seem to be affected by the serum treatment.

The reaction of the serum on the patient was sometimes nil and sometimes the rigidity of the neck was made worse. The reaction on the cerebrospinal fluid seemed in some instances to be one indicative of an increase of the inflammatory process. In certain bulbar cases the use of the serum might be contraindicated.

Another difficulty that had been encountered in the use of the serum was the fact that there were so many different kinds and that it was difficult to standardize them. After all was said and done, it was a fact that one might take any case in which the serum had been used and duplicate it in every particular by a case in which serum had not been used, so that personally I feel that we cannot expect too much from the use of serum. This has been my impression although the number of cases may not be sufficient to warrant any very definite statements.

DR. DONALD BAXTER (by invitation) read a paper entitled

THE PROBLEM OF THE AFTER-CARE

We have had poliomyelitis always partially active, but it has been overlooked. The social conscience seems just to have been aroused to the necessity of caring for these cases. To some who watched the epidemic it seemed to have more particularly a social and economic import. It was very much more prevalent among the poorer classes. This means that there are many cripples to be cared for, not only relieved from suffering, but assisted in such ways that they will in the future be able to become wage earners and to take their proper place as citizens. A committee has been formed having among its leaders Thomas J. Riley and Oliver H. Bartime. The committee has as members surgeons, pediatricists, directors of hospitals, managers of charitable institutions, nurses and private citizens. This committee has several purposes. First it keeps informed as to what other agencies are doing and endeavors to assist these agencies in avoiding duplication of effort. It keeps accurate records for present and future guidance. It is occupied in correcting and confirming this data. It makes arrangements for the treatment of cases that are not under the care of private physicians. It is trying to standardize dispensary treatment. Thus far 3856 cases have been reported upon and 3267 transferred to the care of other agencies. By the methods employed it is believed that much wasteful effort may be saved. It is evident that the great majority of paralyzed cases are not under skillful care; in many cases the family physician has been retained at a great sacrifice

and in others his services have had to be discontinued. We are endeavoring to show these people that hospital and dispensary care is at their service, and having persuaded people to take advantages of the hospital and dispensary treatment offered to encourage them to persist in the treatment prescribed. The committee hopes soon to be in a position to take up other activities, such as that of correcting laboratory and hospital records.

DISCUSSION

DR. GEORGE DRAPER.—I must take issue with Dr. Schwarz. He said that he had the most difficult task of the evening in speaking of the prophylactic and curative treatment of poliomyelitis; I think it is still more difficult to be asked to speak after having listened to such an array of interesting papers. However, there are several points that suggest themselves, largely for the purpose of stimulating still further discussion.

Dr. Louria made many interesting observations, but he did not lay enough stress on the disease being an acute general infection. More emphasis should be laid on this than upon any other one feature of the disease. This was brought to my attention forcibly during the summer. Several men who came to the city to study the disease and who were active in the work on Long Island said they had come to study a paralytic disease, and they did not see as much paralysis as they had expected to see. This was because the cases were all recognized forty-eight to seventy-two hours before any paralysis appeared, the diagnosis being made by the symptoms and by lumbar puncture. In many of these cases the diagnosis was definitely established three or four days before paralysis appeared.

The interesting signs in the chest described by Dr. Louria as "paralytic râles," should be recognized as such and not mistaken for the râles interpreted as pulmonary edema, that occur later when respiration is failing.

Just what the significance of headache is has not been determined. It may be the result of systemic infection or may be due to an invasion of the meninges. Since poliomyelitis belongs to the group of general infectious diseases the headache in the early hours may be part of the general reaction.

Dr. Dubois' paper is based upon much work of the most valuable and enlightening sort. I would like to ask her whether the cell counts were made by the wet method or by a centrifuged smear. The method employed has considerable influence on the interpretation of the findings. Pressure under which the spinal fluid is found seems to have some relationship to the number of cells. When the cell count is high the pressure is low and *vice versa*; there seems to be a constant relationship here.

Exception seems to have been taken to the making of a prognosis on the findings in the cerebrospinal fluid. But no statement has been made as to the time in the course of the disease when the lumbar puncture was made. This is not a question of days but of hours. When one sees a child playing about at noon time, and con-

tinuing to play until 2 o'clock, though perhaps not feeling quite well; then at six o'clock the child is very ill and a lumbar puncture is made which shows 2500 cells, and the child is dead eighteen hours later it is significant. It seems that the information one gets from an examination of the spinal fluid depends upon the time when it is made. There are other cases in which there is no invasion of the meninges where one finds no cellular increase it is perfectly possible to say that they have never developed any cell increase, and in some cases there will be a slight increase and then a recession. If the cell counts are correlated with the clinical findings on the day of onset it may be that some significance can be attached to them.

The examination of the spinal fluid by the Lange gold test is interesting. A very large number of these examinations were made by workers who knew nothing about the clinical history of the cases from which the specimens came. The work was done independently by the different workers and when the results were brought together they corresponded remarkably well.

With reference to the question of treatment, it is doubtful if we should make any positive statements as yet. The public has been much affected by the lack of definite knowledge of the disease on the part of the profession and the ineffective efforts in the direction of treatment. However, I do not know that we have failed; there is a great deal of evidence that would indicate that the serum treatment is very effective, provided it be used early enough.

There is also another point with reference to the irritating effects of the serum. It is well known that in the intraspinal treatment of cerebrospinal syphilis, serum containing hemoglobin often causes much more severe reactions than clear serum. During the stress of the epidemic much of the serum was collected and prepared rapidly, and it is possible that some of it might have contained hemoglobin and that this might be still further irritating to a cerebrospinal tract which is already more or less irritated. This point has been suggested to me by a comparison of cases in which the serum was double centrifuged and those in which serum pipetted directly from the clot serum was used.

DR. CHARLES GILMORE KERLEY.—We have learned considerable about poliomyelitis during the past summer. We now know that the disease is communicable by human agencies and the so-called abortive cases are the ones that are the most dangerous from the standpoint of transmission. It is rather peculiar that the very mild cases and the very severe ones are both of the cerebral type.

Dr. Louria spoke of the symptom of neck rigidity. Cases in which there is no neck rigidity will show a resistance or a reluctance to bend the body forward and an inability to rest the chin on the chest. In a few cases I found this the only symptom definitely pointing to a poliomyelitis. I consider it a very important sign and a decided aid in the border-line cases. There will also be shown by these children a peculiar awkwardness in attempting to bend or pick up objects from the floor. There apparently is not any great amount of pain, but nevertheless there is an involuntary protection against motion in certain directions.

During the past epidemic of poliomyelitis, we have learned to look upon sore throat and hoarseness during the hot months as possible premonitory signs particularly if there is fever and prostration out of proportion to that which we usually expect in an ordinary case of sore throat.

I have seen some unusual paralytic manifestations. In three children, the bladder alone was involved. In one case there was paralysis of the third nerve only in a child eighteen months of age. In two cases both of which were fatal the muscles of deglutition alone were involved. In my patients and those that I have seen in consultation there were no deaths after five days of illness and paralysis did not appear in any case after the seventh day. It does not follow, of course that this is an established standard as such observations have not been the experiences of all.

As to the communicability in a large city like New York, it is impossible to get data of any great value. I had the opportunity during the summer of observing a series of cases that developed in widely separated areas in eastern New York and western Connecticut. I took the trouble to look into the possibilities of exposure in something like fifteen cases, that is the first cases that occurred in a given community where there had been no poliomyelitis for years. In every instance I was able to demonstrate contact with individuals who had been in association with the disease or who came from infected localities.

DR. HENRY L. K. SHAW, of Albany.—I came this evening to learn and not to discuss the papers, but I shall take this opportunity to tell you a little concerning the epidemic in the other half of this State. The cases appeared later than in the City of New York, and it was not until late in July that it seemed worth while to prepare a pin map showing the location of the cases. The first photograph of this map was taken on July 27 and the cases which came directly from Brooklyn or New York are indicated by a special pin. It will be seen that these cases number nearly fifty and are widely distributed throughout the State, although the majority of them are within a radius of 50 miles of New York City. The photographs of this map taken each week show how the epidemic progressed, and up until yesterday there were 3569 reported cases of infantile paralysis. The distribution of the cases shows they followed the line of travel.

There have been about 800 deaths from infantile paralysis and a mortality of about 21 per cent. Hudson was one of the first cities to report the cases, and the first case developed in July but had spent Decoration Day in an infected Brooklyn district. In this city about thirty-six cases developed with only two deaths, and these cases were practically all in a crowded Italian section of the city. In Saratoga, on the other hand, there were eight cases occurring in well-to-do families, and in spite of the best medical attention and nursing, the mortality was 75 per cent. It is difficult to explain the high mortality among certain groups of cases.

I would like to say a word with reference to the plans of the State for the after care of these cases of infantile paralysis. The

State has been fortunate in securing the services of Dr. Robert W. Lovett, of Boston, assisted by Dr. Armitage Whitman, of New York, and Dr. John Hodgen, of Boston. Six nurses have been sent to Boston to learn the methods of massage and muscle training recommended by Dr. Lovett. A series of clinics will be held each day for several months, starting near New York where the first and greater number of cases appeared.

A record of all the cases is kept in Albany, and a letter is to be sent to the physicians reporting cases in the vicinity where the clinic is to be held, inviting them to bring their patients. Dr. Lovett will make a careful examination of each case and prescribe the treatment indicated, and the child will then be turned over to the family physician. If the family cannot afford to pay for the services of a physician the muscle training and the braces will be provided free of charge and it is planned that no case in the State will be neglected. The importance of providing these clinics will be seen from the fact that there are only two or three cities where there are any facilities for holding an orthopedic clinic.

DR. HENRY W. BERG.—I have been interested in Dr. Emerson's report that several isolated islands and institutions in the city have been free from this disease and also in the report that where there were fewest hospital cases there was the highest incidence of infection. That would make it seem that isolation and segregation had materially decreased the extent of the epidemic. This is important and it would be agreeable to both physician and health authorities to feel that they had accomplished what they had intended to do by insisting upon the isolation of cases of infantile paralysis.

I wish to compliment Dr. Dubois, for she has done much actual work in determining the cytology and chemistry of spinal fluids. She has drawn from a vast clinical field and the examinations she has made mount up into the thousands. I wonder how many men have counted hundreds of specimens as have Dr. Dubois and Dr. Neal. It is much to her credit that she has been able to avoid all preconceived ideas and in conclusion to make the statement that diagnosis could not be made from the examination of the spinal fluid alone in poliomyelitis. This is an important statement and an honest statement. Clear fluids are present in other diseases and one cannot differentiate them from poliomyelitis by the cytological and chemical examination. This is important from the fact that the danger from the standpoint of the communicability of the disease is in its preparalytic stage and the nonparalytic cases. I believe the disease is mostly communicable in the preparalytic stage, before the paralysis appears, as is measles before the eruption and in the catarrhal stage. When the paralysis appears then the contagious period is passed to a great extent. It therefore follows that the most important stage to diagnosticate is the preparalytic stage, and we should consider whether it can be done positively clinically. There have been some symptoms not taken into account in other years that have been taken as diagnostic of poliomyelitis during the past summer, and when we make a diagnosis on such insufficient data we need as a sheet anchor a report on the cytological and chemical nature

of the spinal fluid, if we can put anything distinctive on that fluid. Clinically there is no positive pathogenic sign in the fluids of the pre-paralytic stage that does not occur in other conditions and if the cytological examination of the spinal fluids in the early stages only stated that it was a clear fluid that meant that it did not differ from the fluid in some other conditions, in which there is a clear cerebro-spinal fluid. When a man tells of a series of fifty cases seen in the pre-paralytic stage and not one developed paralysis, I can only say I have not seen such an experience duplicated in the early stage of any other infections. When men have observed upward of 2000 cases in one epidemic and that a very large proportion of these were real paralytic cases that is quite a different story. We are not ready to make positive statements concerning the enormous mass of cases to-day but hope to do so in the future.

DR. LINNAEUS EDFORD LAFETRA said: The early diagnosis of poliomyelitis from other meningeal affections and at times even from diseases that do not involve inflammation of the spinal meninges or of the nerves may be exceedingly difficult. In my experience I have come to rely upon two signs: one, clinical and the other laboratory. The most important clinical features of early poliomyelitis is stiffness and tenderness of the neck and back. I have never failed to find this sign in an early stage. Of course, the stiffness of the neck is simply a sign of the meningeal involvement and is naturally present in other forms of meningitis. The laboratory test which is of utmost value is the examination of the spinal fluid for a number of cells and for the presence of globulin. All of us who have worked at Bellevue Hospital have come to rely upon the finding of more than ten cells, together with a globulin test as denoting an abnormal spinal fluid with definite reaction of the meninges to some agent of disease. Of course, these findings are present in all of the acute inflammatory forms of meningitis, in tuberculous meningitis and in syphilis of the nervous system. But the combination of a slightly or gradually increased cell count and positive globulin, together with stiffness of the neck is a very definite evidence of meningitis. Another sign which is very important but not so constantly present is Brudzinsky's phenomenon.

In regard to the spinal fluid findings, it must be admitted that there is much yet to be learned, but we know enough already about the spinal fluid findings in normal children, in those suffering from other types of disease, and in those suffering from various forms of meningitis and poliomyelitis, to feel that the positive findings are just as reliable as the positive findings of the thermometer in pneumonia or typhoid fever, and that the negative findings, if the fluid is taken early in the disease, are equally reliable.

In regard to the cell count and the globulin reaction in cases other than proved meningitis or poliomyelitis, the cell counts of spinal fluid was made by Drs. Schloss and Schroeder in preparation for an article which appeared in the *American Journal of Children*, January, 1916. The normal patients numbered twenty and in these the cells were below six and globulin none. There were thirty-five cases of meningitis occurring during the course of otitis media,

bronchopneumonia, septicemia, gastroenteritis and malnutrition. Among these the cells were below six except in two instances. In both of these the meningitis complicated the otitis. In one the cells were eighteen with negative globulin. In the other, in addition to the otitis, there was a pneumonia along with meningism. The spinal fluid showed eleven cells with no globulin.

I have just tabulated the spinal fluid findings in 125 cases treated this summer (1916) in Bellevue Hospital and in only eleven of them was the spinal fluid reported as showing an increase in cells beyond ten and no globulin. In most of these cases the examination was made late, but some were very rapidly fatal cases. In several cases the first examination showed a large number of polymorphonuclear cells, as many as 3900 being found in one case; this was, therefore, at first mistaken for cerebrospinal. The child subsequently developed facial paralysis and double auditory paralysis. It is interesting to note that after the administration to them of 20 c.c. of Flexner's antimeningococcus serum, the patients polynuclears rose to 4500—quite contrary to what one would expect in cerebrospinal meningitis. As the technic improved there were fewer discrepancies between the number of cells found and the presence or absence of globulin. Early in our series the spinal fluid was reported as normal in several cases with undoubted paralysis; in the latter part of the series this happened only when the fluid was examined late. Repeated spinal fluid examinations were made in many cases. At times there would be an increase in the number of cells and in globulin on the second or third test, if the case was gotten early; but usually, after the tenth or fifteenth day, the cell count was normal although the globulin might persist for some days longer. Examples of negative findings in fluid, 3.66; examples of repeated examinations, 77.81, 88.70 and 70.94. The administration of human immune serum usually but not always increases the number of cells which become predominantly polynuclear. The stiffness of the neck, pain in the back, and the Bradzinsky's and Kernig's signs are increased, or even make their first appearance as a result of the reaction to the serum.

As regards prognosis, anyone who has had an extensive experience with poliomyelitis will be exceedingly cautious about giving a good prognosis before the fourth or fifth day of the disease. No matter how slight the initial paralysis may seem, there is always the danger that the disease will extend to other and more important nuclei. In particular, I think that one should be cautious about giving an absolutely good prognosis in cases of facial paralysis. There seems to be at the present time the feeling that if the facial nerve is involved then all is well. Unfortunately, this feeling is not borne out by a careful study of the cases that have proved fatal. If one considers the location of the facial nuclei, he will really wonder how it is why so frequently the cases of facial paralysis do well, inasmuch as it is so short a distance to the nuclei of other important nerves, particularly the glossopharyngeal and the pneumogastric. Unfortunately, it has been my lot to see combinations of facial paralysis with paralysis of the larynx or the pharynx, which have terminated fatally in almost every instance. When the muscles of the neck are

involved, there is also danger that the phrenic nerve may be included in the inflammatory area, and this is always a very serious matter.

In connection with the paralysis of the facial nerve, I have been interested to look over my hospital records to determine what other cranial nerves have been involved in my cases in this epidemic. The olfactory and the optic nerves seemed to have escaped, although, of course, it is difficult to know about their function in infants and small children. The third (oculomotor) has been frequently involved, sometimes one portion, sometimes another. I have not seen definitely any involvement of the fourth nerve, that of the superior oblique muscle of the eye. Nor have I known of trifacial involvement. The sixth nerve to the external rectus muscle has been very commonly affected, and the seventh is, as we all know, the usual one that suffers. I have one case of double auditory nerve involvement which came on definitely on the day before the child came into the hospital. But the glossopharyngeal nerve is not infrequently affected, and occasionally the pneumogastric, shown by either spasm or flexidity of the vocal cords. The spinal accessory nerve is occasionally involved in the paralysis of the neck muscles, and I have seen one case in which the hypoglossal nerve was paralyzed on the right side.

The disease is one of the most serious with which pediatricists have to cope, and in the present state of our knowledge of its prevention and treatment, we should be very cautious about giving any prognosis during the first two days.

As to the serum treatment, it would seem that some method of standardizing the serum must be devised before results can be compared and its value determined.

DR. LOUIS FISCHER.—In poliomyelitis of the bulbar type the prognosis is always bad. One of my cases, a child three years old, could not speak nor swallow, and became comatose. It had recurring convulsions. We did a lumbar puncture, injected 15 c.c. of serum, and the child recovered.

A second case was that of a six-year-old child in a very serious condition. The child was given two injections of serum, two days apart, and recovered without any paralysis.

I have seen seven cases injected with 15 c.c. serum early in the disease, and all recovered without paralysis. Three cases had respiratory paralysis, all of these died. Some of these cases were mistaken for bronchopneumonia. I have not seen a single case of respiratory paralysis recover.

Some children were very much improved when merely a lumbar puncture was done, the spinal fluid tapped, and the canal washed with normal saline solution. My impression of the serum is that we should advise its use in every case, but it must be used early during the fever, in the preparalytic stage. When paralysis has set in, then too much must not be expected from the serum.

The serum was obtained through Dr. Park and Dr. Zingher.

It is marked Serum B and Serum C, but I cannot say which is most efficient.

DR. ABRAHAM ZINGHER.—Several methods have been suggested during the past summer in the treatment of anterior poliomyelitis. The one method that has given us the most satisfactory results, has been the use of serum obtained from immune donors who have had poliomyelitis either recently or from one to several years previously. The serum was administered intraspinally in doses of from 10 to 15 c.c. and repeated every twenty to twenty-four hours until two to three doses were injected. To obtain as large a supply of serum as possible, and make it available to the members of the medical profession in this and adjoining states, we had to have recourse to a certain amount of publicity. We ourselves had the opportunity of using serum in 160 cases at the Willard Parker Hospital, and in thirty-three cases at the Minturn Hospital. In addition, the serum was supplied for 225 cases in the private practice of a number of physicians.

The serum injected intraspinally in the acute stages of poliomyelitis produces a moderate polynuclear leukocytosis which is increased in intensity by the presence of hemoglobulin and tricesol, which was added as a preservative. This cellular reaction is not specific, since similar reactions were obtained with normal human serum, the secondary albumoses of Jobling, and to a less extent with horse-serum. It is probable that the phagocytic action of the leukocytes is enhanced by the presence of specific antibodies in the immune serum. If some of the recent work of Rosenow's is verified and the disease is found to be caused by the invasion of the vascular portions of the spinal cord and brain by an attenuated streptococcus producing most probably the lesions of an embolic type, then our conceptions of the pathology and treatment of the disease will have to change. We do know, however, that one of the chief weapons of the body against the streptococcus is the phagocytic action of the polynuclear leukocytes.

The effect of the immune serum seems to be fairly shown by the thirty-three cases treated in the Minturn Hospital. These cases were carefully observed and received the full treatment. Of the thirty-three cases fourteen were in a preparalytic stage of the disease at the time the serum was administered: of the fourteen, eight remained free from paralysis, two developed paralysis within twelve to eighteen hours after the first dose of serum, and four developed paralysis forty-eight hours or more after the injection of the serum. Of these four, two patients showed an involvement of the extremities, one of the right side of the face and one an external rectus of one eye. The rapid and decided subsequent improvement in these cases was noticeable. None of the cases treated in the preparalytic stage of the disease died. Of the nineteen cases treated with serum after paralysis had set in, three died soon after the injection (within twenty-four hours) and sixteen recovered with varying degrees of motor impairment.

DR. HENRY HEIMAN.—I regard poliomyelitis as a communicable disease, not readily communicable, but about as much so as tonsillitis. Anyone susceptible and exposed to tonsillitis may contract the dis-

ease—it is about the same with poliomyelitis. Among the first symptoms may be inability to flex the head as pointed out by Dr. Draper as a pathognomonic sign. This is probably due to an involvement of the posterior meninges alone, as distinguished from meningococcus meningitis where the entire meninges may be involved, giving opisthotonos or rigidity of the neck. The meningeal type of poliomyelitis frequently causes pain in the legs and abdomen which I regard as Head zones due to an involvement of the posterior nerve roots.

I wish to put myself on record as observing during this epidemic a characteristic sign which is present in practically all cases of poliomyelitis, especially of the meningeal type. This is a distinct fine tremor of both hands elicited best by having the hands out-stretched and fingers spread apart. It is present early in the disease and may persist as long as ten or twelve weeks. It is probably due to an inflammation of the posterior meninges which extends up into the cerebellar-rubral tract. The cerebrospinal system is the target for the virus of poliomyelitis and consequently there is not a spot from the cortex to the cauda equina that may not be involved.

DR. LAVINDER, in closing the discussion, said: I very much envy the men who believe in the communicability of the disease; I have given the basis of my beliefs which show that I am still somewhat skeptical. I think that Dr. Draper was right when he said that we have not yet had time to digest the material that has been furnished during the present epidemic and until we do we cannot draw conclusions.

DR. LEON LOURIA, in closing the discussion, said that he wished to emphasize the fact that poliomyelitis is an acute infectious disease and that there can be no doubt about it. The medical profession at large is not sufficiently familiar with the abortive types of the disease, and he felt that as long as we call the disease poliomyelitis it would imply to the medical mind the presence of paralysis, and exclude the nonparalytic cases. We may help to broaden the conception of the disease by changing the nomenclature and for want of a better name, he suggested to call it the Heine-Medin's disease, a name adopted in Germany and Austria, and also by Dr. Barker in his *Monographic Medicine*.

In doubtful cases the cytology and chemistry of the cerebrospinal fluid supported the diagnosis; with rare exceptions, only in a few cases was the fluid negative.

He could not agree with Dr. Berg that there is nothing distinctive in the symptomatology of early poliomyelitis. He saw a large number of cases, over 350, in the acute stage in private practice, and gained the impression that these children have an appearance that differentiates them from other sick children. Just what this appearance is, he was unable to put in exact words, but, it is nevertheless distinctive.

Cases where the paralysis involves only the facial, run as a rule a favorable course, but the prognosis must be guarded while the fever exists. He recalled a case of a boy of thirteen whom he saw about forty-eight hours after the onset with a right facial only, and he was

encouraged but for a few hours, as the boy rapidly developed a fulminating descending type with involvement of the bulb and death occurred the following day.

While drug and serum treatment do not as yet give definite results, he felt that in many instances the lumbar puncture brought relief and influenced favorably the course of the disease.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Types of Hydrocephalus.—C. H. Frazier (*Amer. Jour. Dis. Child.*, 1916, xi, 95) suggests the following classification, which has a physiological background with direct clinical application: I. Hydrocephalus obstructivus. II. Hydrocephalus nonabsorptus. III. Hydrocephalus hypersecretivus. IV. Hydrocephalus occultus. In *Hydrocephalus obstructivus*, the internal hydrocephalus of the old nomenclature, there is mechanical obstruction to the natural drainage of the cerebrospinal fluid from one or more ventricles into the subarachnoid space, where the absorption takes place. This obstruction may be due to a congenital defect or be the result of adhesions from a preëxisting inflammatory lesion. In *Hydrocephalus nonabsorptus*, absorption is delayed or defective as has been proved by the phenolsulphonaphthalein test. The third type, with apparent excessive accumulation of fluid has been attributed to hypersecretion—*Hydrocephalus hypersecretivus*. The fourth type, for which the term *Hydrocephalus occultus* has been chosen, occurs usually in children, though occasionally in adults, and is characterized by excess of fluid in the ventricles, basal cysternæ, and sometimes throughout the subarachnoid space, without necessarily any increase in the cranial dimensions. Under normal conditions, when phenolsulphonaphthalein is injected into the lateral ventricle, it should appear in the fluid withdrawn by lumbar puncture within three to eight minutes. If, therefore, after injection the fluid from the spinal canal is not stained within the specified time, it may be assumed that the drainage of the ventricles has been interrupted, and that we are dealing with hydrocephalus obstructivus. It has been proved that the quantity of cerebrospinal fluid absorbed within the ventricles, if any, is a negligible quantity; and that from 30 per cent. to 60 per cent. of phenolsulphonaphthalein should, under normal conditions, be secreted by the urine within the first two hours. If, therefore, 1 c.c. is injected into the ventricle and the amount secreted by the first two-hour urine specimen estimated, we have at once additional evidence that we are dealing with the obstructive type. The same test may be applied in the more unusual type of unilateral hydrocephalus. After the dye has disappeared from the urine following the test of one ventricle, the test may be applied to the other. In the second test, from a lumbar puncture needle, 1 c.c. of cerebro-

spinal fluid is allowed to escape. A 2 c.c. record syringe, containing exactly 1 c.c. of the neutral phenolphthalein solution is attached to the lumbar puncture needle, and the piston withdrawn until the syringe is full. The solution of dye thus diluted is slowly injected into the subarachnoid space; the time of injection is noted and in five minutes a specimen is tested for the dye, and the entire amount of urine secreted in two hours collected. In the normal, a trace of the dye should appear in ten minutes and the entire amount excreted within the first two hours. Any marked diminution in the time or deviation from the amount indicates delayed absorption. If we are dealing with the internal or obstructive type, the absorption of phenolsulphonaphthalein from the subarachnoid space and the excretion by the kidney is practically normal. If on the other hand, we are dealing with the nonabsorptive type, the time of appearance of the dye in the urine is delayed and it may not appear for an hour or more, and the amount secreted in the two-hour period is correspondingly low; frequently but a trace is detected. In a few cases no phenolsulphonaphthalein reaches the urine in four or six hours. The simplest and most effective method of dealing with hydrocephalus obstructions is puncture of the corpus callosum. In the non-absorptive type the writer recommends the establishment of a drainage tract into the pleural cavity. When the lesion is due to hypersecretion he resorts to thyroid feeding. Thyroid invariably acts as a depressor on the choroid plexus, and invariably reduces the secretion of cerebrospinal fluid. This reduction is notable in amount, in constancy and in duration.

Metabolism Studies in Hemophilia.—In presenting a study of the metabolism of two cases of hemophilia, M. Kahn (*Amer. Jour. Dis. Child.*, 1916, xi, 103) says it would appear that not all hemophilia patients present similar pathologic-chemical disturbances. There seems to be no derangement in the metabolism as measured by the intake and output of nitrogen, sulphur, calcium, etc., in the case of hemophilia vera. There are, however, certain bleeders in whom the disturbing factor seems to be a lack of calcium content of the blood, and an inability on the part of their organisms to assimilate properly the lime from the food. In these cases the remedy indicated would be to administer the lacking mineral constituent in the form of the chloride or the lactate of calcium.

Carmin Test for the Duration of the Complete Food Passage in Infants and Children.—A. Hymanson (*Amer. Jour. Dis. Child.*, 1916, xi, 112) tested the time of the food passage on two separate sets of subjects. The first comprised twenty-one very young and healthy breast-fed nurslings from one to six days old, at the Jewish Maternity Hospital. Carmin was given in powder form in $\frac{1}{2}$ -grain doses. These babies were nursed every three hours (two with subnormal temperature, nursed every two hours, took very little milk). The temperature varied from 96 to 99° F. The number of stools daily was two or three. The time of the appearance of red stools varied from four hours to eighteen hours, and for the disappearance of the stain from four to twenty hours were required. These figures do

not differ radically from those of Nobécourt and Merklen and Spivak. To twenty-five sick children from the Beth Israel Hospital, varying in age from six weeks to six years, the dose of carmin given was from 1 to 2 grains. The children in the great majority of cases had subfebrile temperatures (under 101° F.) and a number had been attacked with severe maladies like bronchopneumonia, endocarditis, etc. The shortest first appearance of the carmin was from twenty-five to thirty hours. The marked differences between the small figures of Triboulet (three to twelve hours) for complete passage, and the large figures of the author (average twenty-five to thirty hours), seem to be wholly due to the fact that Triboulet's sick infants all had diarrhea or enteritis, while in the author's material, bowel troubles were in a minority.

The Blood in Tuberculous Meningitis.—Analysis by E. A. Morgan (*Amer. Jour. Dis. Child.*, 1916, xi, 224) of 252 blood counts in 169 cases shows that the leukocyte count in tuberculous meningitis is higher than has been heretofore described. The average in this series was 20,000 per cubic millimeter with 72.6 per cent. polymorphonuclears. The total leukocyte count and the proportion of polymorphonuclear cells vary with the stage of the disease; e.g., both counts increase as the disease advances. There is a relative but not absolute diminution in the mononuclear elements of the blood. There is a definite relationship between the intensity of the tuberculin skin reaction, on the one hand, and the total leukocyte count and polymorphonuclear percentage on the other. Diminution in the former is usually accompanied by an increase in the latter, both being evidences of a failing resistance by the body to the tuberculous infection.

Hemorefractometry in Infectious Diseases of Children.—The studies of Mello-Leitaa (*Amer. Jour. Dis. Child.*, 1916, xi, 214) show that the refractometric index of blood serum in nurslings is lower than that of the adult, and increases slowly from the first month till the age of thirteen to eighteen months, reaching then a definite value. Achard, Touraine and Saint-Girons' albuminemic curve is constant in acute infectious diseases of infancy and childhood. The spasmodic period of whooping-cough produces high albuminemy, which permits the diagnosis from tuberculous tracheobronchial adenopathy. The hemorefractometric coefficient in tuberculosis is generally lower than normal. Syphilis increases remarkably the protein percentage in blood serum.

Sialolithiasis and Sialodochitis in Childhood.—Reporting illustrative cases, H. Neuhoof (*Amer. Jour. Dis. Child.*, 1916, xi, 232) states that sialolithiasis in childhood cannot be termed the exceedingly rare, almost unknown condition it is presumed to be. The manifestations are more clean cut and evident in children than in adults, the diagnosis can be made more readily, the surgical treatment is simple and efficacious. The salivary duct should be probed in every instance of enlargement of a salivary gland in a child when a definite cause for the enlargement cannot be ascertained. There is a hitherto undescribed form of sialodochitis of Stenson's duct in

children, secondary to inflammation of unknown origin, leading to an enlargement of the parotid gland that can be readily mistaken for sarcoma or mixed tumor. The gland is considerably increased in size, firm, nodular, adherent; the orifice and buccal end of the duct are embedded in stenosing cicatricial tissue. There is a tendency to repeated recurrences of the parotid swelling after slitting the mouth of the duct, but cure follows promptly the excision of the diseased end of the duct.

Transfusion of Babies with Mothers as Donors.—It was the idea of T. H. Cherry and E. G. Langrock (*Jour. A. M. A.*, 1916, lxi, 626) to establish the complete compatibility of mother's and infant's blood by performing a series of hemolytic tests on new-born babies and their own mothers. Mothers could advantageously be used as donors because when an infant has had a severe initial hemorrhage leaving it in an exsanguinated state, the delay in such a case in procuring a compatible donor on whom the preliminary tests should be made may be fatal to the infant; because when the bleeding is discovered during the night, the procuring of a proper donor would entail considerable delay; because in certain localities where no laboratory is at hand and such a condition should arise, it is advantageous to know that a compatible donor is nearby; and again, because the element of expense enters into the transaction in a certain number of cases. In the thirty-four tests that were carried out on the mothers and babies, no hemolysis or agglutination occurred. From these experiments the writers have concluded that all mothers can be used as donors for their infants in the transfusion of blood, provided no contraindications exist on the part of the mothers. It has been estimated that the volume of blood possessed by an infant is one-twentieth of its body weight. In an infant weighing 7 pounds the amount of its blood supply would approximate $5\frac{3}{5}$ ounces. If one-third of the entire blood supply is lost by hemorrhage, there is grave danger of death taking place. Therefore, to transfuse a baby who has lost sufficient blood for symptoms of exsanguination to be present, it is important that a known quantity of blood be thrown into its circulation. If a too large amount enters the circulation, the heart muscle, already weakened by hemorrhage, may become acutely dilated, and death occur from a measure that is meant to be therapeutic. From 60 to 75 c.c. of blood are approximately sufficient to supply the infant with the necessary elements to promote clotting and enough cellular elements to replace those lost by hemorrhage. This is an important reason why the indirect method of transfusion should be practised on these bleeding infants, as well as the argument for its simplicity of technic.

Mitral Stenosis in Young Children.—Reporting two cases of mitral stenosis in boys ten and seven and one-half years of age, one of whom gave a four plus Wassermann reaction, M. H. Bass (*Arch. Pediat.*, 1916, xxxiii, 107) says that in cases of mitral stenosis in children, especially where there are no physical signs of insufficiency present, though we have no definite proof of their luetic origin, syphilis should be thought of and a Wassermann test done. Cardiac

disease, especially valvular stenosis, exerts a considerable influence on the growth of the individual. A careful study of the literature on the congenital nature of mitral stenosis leads to the following conclusions: (a) Mitral stenosis has been observed at autopsy in infants. (b) Mitral stenosis has been observed in children over five years old in whom there was no apparent etiological factor present. Such cases have been termed "congenital," though without sufficient evidence of their being so. (c) No case of mitral stenosis has been found reported in children between the ages of infancy and five years. (d) The clinical picture described by Duroziez as Pure Mitral Stenosis should not be confused with the congenital lesion occurring as a great rarity in infants.

Treatment of Diphtheria Carriers with Iodized Phenol.—The cases reported by W. O. Ott and K. A. Roy (*Jour. A. M. A.*, 1916, lxi, 800) consisted of carriers convalescent from clinical diphtheria and some that did not have diphtheria but were persistent carriers. In some cases, other methods had been persistently tried with failure to obtain negative cultures. In all cases iodized phenol (acidum carbolicum iodatum) of the National Formulary was used. It contains 60 per cent. phenolcarbolic acid), 20 per cent. iodine crystals and 20 per cent. glycerin. In pharyngeal cases, the tonsils, uvula and posterior wall of the pharynx were swabbed every forty-eight hours until negative cultures were obtained. In nasal cases, the entire anterior part of the nasal cavity was swabbed with iodized phenol every forty-eight hours. Care was taken not to allow the preparation to run over the face or drop into the larynx. Cultures were always made a few minutes before the local application. In this way, forty-eight hours elapsed after each application of iodized phenol before another culture was made. Seventeen cases were treated. Negative cultures were obtained after one application of iodized phenol in six cases (35 per cent.); after the second application in five cases (29 per cent.); after the third application in two cases (12 per cent.); after the fifth application in one case (6 per cent.), and after the sixth application in two cases (12 per cent.). One case (nasal) was under treatment for twenty-one days and required nine applications before negative cultures were obtained. With the exception of this case, none of the other sixteen were under treatment longer than eleven days. Fifteen of the cases were followed after leaving the hospital, and negative cultures obtained in all. No treatment had been used since the discharge of the patients from the hospital, and all of them had been out from one to three weeks when these cultures were made. No bad results have been noticed from the use of this rather strong preparation in the nose and throat. The application is painful for half a minute or less until the anesthetic action of the phenol takes effect. A thin escharotic membrane forms at the site of application which remains for about twenty-four hours. This disappears entirely within forty-eight hours after swabbing, leaving the throat red for a few days. After the redness disappears, the throat returns to normal.

Removal of Tonsils and Adenoids in Diphtheria Carriers.—S. A. Friedberg (*Jour. A. M. A.*, 1916, lxvi, 810) states that while dry and finely powdered kaolin properly applied materially shortens the necessary stay of patients in the hospital, in several instances the local application of kaolin seemed to be without any effect on the bacilli. In view of the prompt disappearance of the bacilli in these cases after tonsillectomy and removal of adenoids the writer reports the results of this procedure in six cases. In none of these patients did the operation have any different general effects than it has ordinarily. In all of the patients the Schick test gave negative results just before the operation. Six successive negative cultures were required before the patients were discharged. The results obtained in this series indicate that in persistent carriers it may be necessary to remove the tonsils and adenoid tissue if it is desired to terminate promptly the carrier condition. The bacteriologic examination should be made with care, as applications of medicinal agents may destroy the bacilli on the surface while leaving unaffected those in the crypts of the tonsils and the folds of the adenoid tissue. As to the time the operation should be performed, it is perhaps advisable to wait from two to three weeks after the clinical recovery of the patient.

Treatment of Epidemic Meningitis.—J. B. Neal (*Jour. A. M. A.*, 1916, lxvi, 862) says that the most common mistakes in serum treatment of epidemic cerebrospinal meningitis seem to be giving too few doses of serum if the patient improves considerably after the first one or two injections, and failing to persist with the serum if the improvement is very slow. It has been the experience of the meningitis department during the past five years that it is rarely safe to give less than four doses of serum on consecutive days, even if the improvement clinically is very rapid and the organisms disappear from the fluid after one or two injections. In cases which have been running on for some time and in which the patients are evidently improving when first seen, one or two injections of serum are sometimes sufficient. Occasionally in a case seen very early and clearing up quickly, only three injections may be given. A case of average severity usually requires from four to seven injections. It is safer to give the injections on consecutive days until it seems evident that the patient is out of danger, than to skip a day or two when a slight improvement occurs, thereby giving the organism a chance to increase. Puncture for the relief of pressure may have to be done several times during convalescence. At such punctures, a little serum may be injected, especially if a large amount of fluid is withdrawn. In a small percentage of cases—from 5 to 10 per cent.—a large number of injections may be necessary before the termination of the case. A certain number of such cases terminate fatally. Doses of serum larger than 20 c.c. need to be given with extreme caution, even though very large amounts of fluid are withdrawn. The serum treatment should be continued until the fluid has been sterile for two or three days and until the patient clinically is much improved.

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